

LIBRARY
UNIV. OF TORONTO
1922

JUL 15 1922

DISCOVERY

A MONTHLY POPULAR JOURNAL OF KNOWLEDGE

EDITED BY EDWARD LIVEING, B.A.

SCIENTIFIC ADVISER: A. S. RUSSELL, D.Sc.

Trustees:—SIR J. J. THOMSON, O.M., F.R.S.
PROF. A. C. SEWARD, Sc.D., F.R.S.

SIR F. G. KENYON, K.C.B., F.B.A.
PROF. R. S. CONWAY, Litt.D., F.B.A.

Vol. III, No. 31. JULY 1922

(Annual Subscription 12s. 6d. Post Free)

PRICE 1s. NET

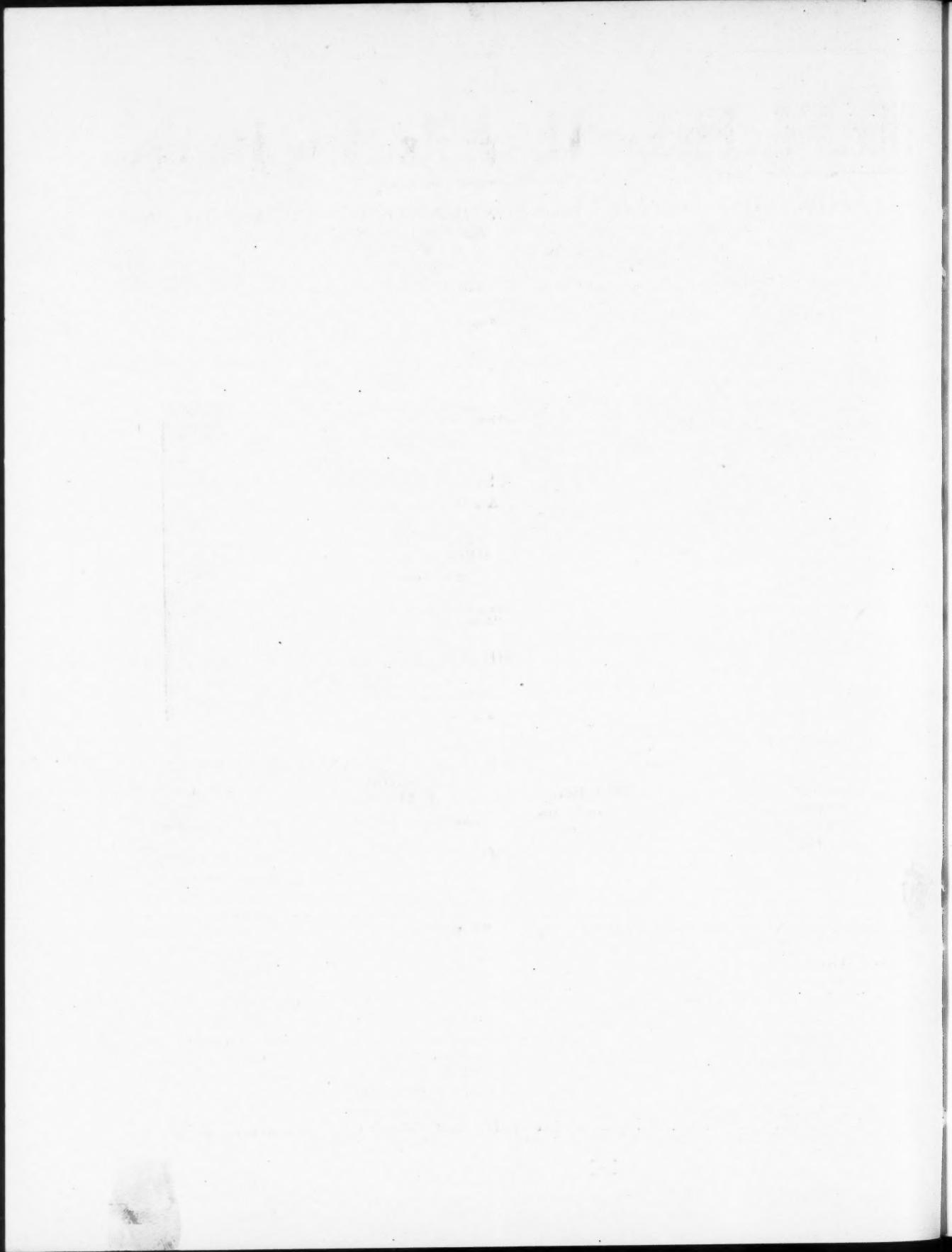


THE GREAT PYRAMIDS TAKEN FROM AN AEROPLANE

CONTENTS

	PAGE		PAGE
EDITORIAL NOTES	169	THE FATE OF A GREAT LYRIC	183
THE PROGRESS OF AERIAL PHOTOGRAPHY	171	POET—I	Edward Liveing
Major W. T. Blake		NEW YEAR DECORATIONS IN CHINA	188
THE BIOLOGY OF CORAL REEFS	174	The Rev. C. W. Allan	
F. A. Potts		REVIEWS OF BOOKS	190
THE FLIGHT FROM REALITY	178	Arctic Exploration—The Temple Coins of Olympia—A Primitive Island Race—Scientific Books, etc.	
F. A. Hampton		BOOKS RECEIVED	194
NEW LIGHT ON THE PILTDOWN SKULL	181	CORRESPONDENCE	195
E. N. Fallaize		Lost Islands of the Southern Ocean—Taxation and Unemployment	

JOHN MURRAY, 50A ALBEMARLE STREET, LONDON, W.1.





DISCOVERY

A MONTHLY POPULAR JOURNAL OF KNOWLEDGE

Vol. III, No. 31. JULY 1922.

PRICE 1s. NET.

DISCOVERY. A Monthly Popular Journal of Knowledge.

Edited by EDWARD LIVEING, B.A., Rothersthorpe, Northampton, to whom all Editorial Communications should be addressed. (Dr. A. S. RUSSELL continues to act as Scientific Adviser.)

Published by JOHN MURRAY, 50A Albemarle Street, London, W.1, to whom all Business Communications should be addressed.

Advertisement Office: 34 Ludgate Chambers, 32 Ludgate Hill, London, E.C.4.

Annual Subscription, 12s. 6d. post free; single numbers, 1s. net; postage, 2d.

Binding cases for Vol. II, 1921, are now ready. Price 2s. 6d. net each; postage, 9d.

Editorial Notes

THERE are many ways of writing about science, but all would be in praise of it, and most would be unnecessary. For it may now be taken for granted that science holds a high position in the minds of thinking men and women, and that it is one of the things that will continue to grow in power and influence. Regarded merely as a matter of interest for leisure hours, the discoveries of science are engaging the attention of a gradually increasing body in the community. But there is an aspect of science which is often emphasised, and yet one to which attention might be often profitably called, and that is its effect on modes of thought, the value of its method in forming opinion.

* * * * *

Science, no doubt, has concerned itself mainly with simple things, the easy problems, but what an achievement is hers! How has she so often successfully reached the bottom of things? By a method, a method which consists in collecting and weighing evidence, organising its facts, and generalising them to a clear conclusion. Science, it has been said, is really an animated logic in which the mind receives its first training among real things—real palpable things—not mere words or abstractions. Its method consequently should help us to be both logical and lucid, to go straight towards the truth instead of wandering around all anyhow. The thesis of these notes is that the scientific method can

be and should be applied to all questions that matter a great deal, questions both personal and national which do not appear to be getting solved by the present methods, and which indeed are at a distance from solution which is roughly proportional to the solver's neglect of the scientific method.

* * * * *

The subject is big, and we can say little more about it here beyond drawing attention to its existence. Let us contrast, however, the opinions expressed on scientific matters with those on subjects, more difficult and complex perhaps, but which are yet capable of being investigated by the methods of science. It is not possible for anyone to talk nonsense seriously about scientific matters without quickly being found out, and so for the most part the uninformed man keeps his mouth shut. But, unfortunately, on other subjects, like economics, history, sociology, politics, where the scientific method has got little more than a footing, the expert who knows his subject as well as at present it can be known is worried by all kinds of uninformed people, who speak as with authority out of empty minds. We, the listeners, do not heed the expert, but tend to accept whatever is personally most pleasant to us, without inquiring sufficiently from what evidence or experience the conclusion we accept is derived. Just think, for example, of the kind of evidence, and the kind of people who give it, from which we are asked to form an opinion on, say, the working of prohibition in the United States, or on some political subject. And the tragedy is that many scientific things concerning which we demand a high standard of truth do not matter very much, while the other things do.

* * * * *

Let us consider one of the latter things first. Many writers in the political reviews tell us that war is a "biological necessity," that wars will always be fought, that human nature never changes, and so on. Many people believe this. Let us consider very briefly the first statement: war is a biological necessity. Who say this? It was said and is repeated by those who know little about man, little about his past, little about biology. But the biologists don't say this, and when people are talking about biological necessities they

DISCOVERY

have a right to be heard. And, indeed, the men who have studied this subject as ably and as completely as human beings can study anything take a different view.¹ They think that biological necessities like over-population and search for food have little to do with causing war. War is, they believe, a custom. They are even inclined to think it a custom of relatively late origin. It is now merely a mode of action whereby an organised state tries to achieve certain political ends. Note the important bearing of this informed view of war on our political conduct. War, a biological necessity, seems an evil we are powerless to resist. But if the biologists are right in thinking there is nothing in the nature of man or of social organisations which renders war inevitable, it is within the power of mankind to renounce war as a mode of action. This illustrates clearly how an unscientific view can lead people in the wrong direction.

* * * * *

Let us take, secondly, an example from physical science itself. Some months ago there was great ado about a man in Canada who claimed he could bring down rain artificially in a dry district. He had, among other things, a box of chemicals whose contents he kept secret, and he claimed that in some way or other this (the box, not the secret) helped to bring down the rain. Many believed that this method was an excellent one, because rain and clouds often appeared as if in obedience to the magician's box. But none of these observers really sifted the weather statistics of previous years to learn if there was really anything abnormal in this. On the other hand, many people condemned a procedure of this kind as a fraud (or, to use a better-tempered phrase, a "frost"), not because they knew anything about meteorology or this particular application of it, but simply because they did not understand it. They did not understand it, and therefore it was wrong. A second objection to the method was that the rain-producer was paid when he achieved a success, but was not fined correspondingly or, I believe, at all when he failed. This was considered unsporting, and because the rain-producer was not a sportsman it followed at once, these people argued, that the method must be bad.

* * * * *

It is of course apparent that none of these opinions are of any value in helping towards an ideal—man's ability to produce rain wherever or whenever he wills. But they are typical of the kind of argument which people love to use. The only one whose opinion is of value is the meteorologist who has studied this subject. What does he think? As a matter of interest we may give his views. The meteor-

ologist² says two things. First that the scientific scrutiny of results furnishes no real evidence whatever that anything abnormal occurred when the rain-producer was active, and secondly that, as far as he knows, there is only one way of making water vapour in the air condense, and that is by cooling it below its dew-point. This may be done in two ways: by cooling the air directly, which is impracticable because of the cost of cooling, and by raising the moist air high enough and, by so decreasing its pressure, cooling it; but this cannot be done because there is no source of energy available to do it. Other ways have been suggested from time to time, notably a method of agitating the air by firing guns or exploding shells, but these, after consideration, are rejected as not being of value. The meteorologist thinks artificial production of rain impossible at the present time.

* * * * *

There are two things we should say in conclusion. We do not believe the scientific method is universally applicable; and on those subjects to which it is applied individuals have not, as a rule, the time or the ability to get at the truth themselves by the approved methods. But there are experts, and we must trust them.

* * * * *

According to a telegram which appeared in *The Times* of April 24th, a remarkable discovery of "mummy caves" more than sixty feet below the ground has been made in the Koster district, 100 miles west of Johannesburg. It was reported that the remains of a tiger had been seen among the mummified animals in the cave. The tiger, however, does not occur in South Africa. The son of a former owner of the cave stated that he partly explored the cave, which is of great extent, in 1912, and in one place high walls were covered with red pictures, which it may be assumed were similar to the bushmen's paintings. A later dispatch states that the caves have been visited by a scientific investigator, who found in the neighbourhood numerous implements and traces of a vanished race. Although the character of the evidence is not more precisely defined, it may be presumed from this statement that the implements were of palaeolithic and not of the usual bushman type. Further investigations are to be made of which the results will be awaited with interest.

* * * * *

Interest in the problem of the antiquity of man has been further stimulated by the discovery last year at Foxhall in East Anglia of implements which have since been accepted by the highest authorities as undoubted evidence for the existence of man in the Tertiary period. This evidence would, therefore, carry back man's existence to a date many thousands of years

¹ See *The Population Problem*. By A. M. Carr-Saunders. (Oxford: Clarendon Press.) P. 305.

² *Nature*, November 3, 1921. P. 313.

before that which has hitherto been generally accepted. The relation of the different types of palæolithic implements to the glacial epochs has also been the subject of a number of articles, written from different points of view, which have appeared and are still appearing in *Man*, the monthly journal of the Royal Anthropological Institute. As a result it would appear that the opposing schools of thought are gradually narrowing down their differences to a point at which the issue may be submitted to the practical test of further geological investigation. The subject is to be ventilated further in a joint discussion between the Anthropological and Geological Sections of the British Association when that body meets at Hull in September next.

The Anthropological Section will also discuss at the same meeting various matters relating to anthropology and archaeology of the north-east coastal area of England. Among these will be the important question of the occurrence in this country of the early Neolithic culture known as Maglemose, the character and distribution of early Scandinavian art in the north of England, which will form the subject of a communication from that well-known authority, Mr. W. G. Collingwood, and Professor Allan Mawer, of Liverpool, will deal with the ethnological evidence afforded by the study of the place-names of this area.

* * * * *

The Rutenberg controversy will have taken many an ex-warrior's memory back to Palestine, and in particular to the valley of the Jordan, whose waters are apparently to be utilised for irrigation and for the generation of electricity. Little over four years ago, when two successive raids were made by British troops across the river and into the hills of Moab, the valley was the scene of some of the intensest fighting in any "side-show" during the war. As is well known, the valley just north of the Dead Sea is 1,200 feet below ocean level, and is the lowest place on the earth's surface. The second raid was carried out in steaming heat, with the thermometer often at 115° in the shade, and amidst swarms of flies, lice, and mosquitoes. It was only a partial success; the Turks had brought up strong reinforcements. The whole valley, of course, came into our possession in the final offensive in the early autumn of the same year. The Jericho side of the river is dry and barren, but the Plain of Moab, which is already roughly irrigated, is a most fertile producer of grain. There is no doubt that the river, whose current through much of the year is turbulent, could be successfully harnessed for the production of electricity. Many of the flora and fauna of this weird region are unique. A "large scale" expedition of zoologists and botanists to the valley would obtain most important results.

The Progress of Aerial Photography

By Major W. T. Blake

AERIAL photography first came into prominence during the war, when its value at once became apparent. For some little time considerable difficulty was experienced in obtaining a suitable camera, and still more in the production of a long focal lens of large aperture.

Generally speaking, once aerial photography had been developed, it was found that the camera would record many objects which were frequently not observed by the pilot or observer. Photographs were usually taken with the camera pointing vertically



FIG. 1.—YPRÉS FROM THE AIR (FEBRUARY 1917) SHOWING THE CATHEDRAL, AND CLOTH HALL IN THE CENTRE OF THE PICTURE.

A unique photograph, never before published.

downwards either through an aperture in the floor of the aeroplane or strapped to the side of the fuselage. It was usual for the pilot to fly on a level keel at an altitude decided previously, whilst the observer took the photographs as desired. It was generally found best to fly up-wind whilst making the exposure in order that the ground speed of the aeroplane might be as little as possible, though it was found that when taking photographs at a great altitude an extremely fast exposure was not necessary.

Photographs were taken either singly of specific objects, or in the form of an overlapping series covering a long line of country. These photographs were then printed and joined up in one continuous strip, showing, for example, a sector of the enemy's trenches. When it was desired to photograph any given area, one or more machines flew over this area on certain predetermined lines, each taking a series of strip photographs. These were afterwards fitted together in a



FIG. 2.—A MOSAIC OF ALEXANDRIA, CONSISTING OF 174 PHOTOS.

mosaic, and the whole was then rephotographed and distributed to the various commanders. After the war this method was employed experimentally for town-planning purposes and for exploration work, where it has been proved of the greatest possible use.

The British camera most generally used is constructed by Messrs. Williamson Brothers, the size of the plate being 5×4 in. The cameras are of a fixed focus type with long focus lenses. Panchromatic plates are invariably used in order that correct colour

rendering may be secured. Shutters are of the focal plane type working directly in front of the plate. Several efforts have been made to produce a type of camera which will automatically expose a plate and change it at definite intervals, so that the pilot will have little to do except fly the machine, whilst other attempts have been made to produce town plans by means of kinematography.

Apart from military requirements, the civil uses of the aerial camera will be in town-planning and in

carrying out survey work in countries where natural conditions make ground survey difficult, if not impossible.

One of the most interesting cases in which aerial photography has been used was in the dispute some little while ago between the municipal authorities of Edinburgh and Leith with regard to the boundary between these two places. When affairs had reached a high legal state, it was found necessary to obtain a map of the boundary as no up-to-date map was available. In order to secure the requisite information in the shortest time and with the least expense, an aeroplane was sent up and in the course of one flight secured a series of photographs which were enlarged and pieced together, showing clearly the whole of the disputed area.

After the Armistice all the big towns in Egypt were accurately surveyed from aircraft. In India, Canada, and the United States aircraft have been used to photograph the timber areas, and from the shading, the type of timber which grows in these areas. For medical purposes aerial photography has been employed in order to locate mosquito-breeding swamps.

One of the latest applications of aerial photography

has been in Venezuela, where aircraft have been employed to take photographs in the Orinoco Delta in order that the ground might be surveyed for oil-bearing districts. This country is practically impossible to negotiate on foot, but it was found that aircraft could make use of the waterways and photograph the surrounding country, the oil-bearing areas showing up clearly as bare regions in the surrounding vegetation, for oil kills all trees and shrubs in its neighbourhood.

At the present time one of the greatest needs for aerial navigators is the production of suitable and reliable air maps. Such maps must be accurate and should show the ground to be flown over in such a manner that it should be easily recognisable by the pilot of a machine. Existing maps are, in many cases, quite useless, and it is probable that the best form of map will be that prepared entirely from aerial photographs of the routes flown over. These will need certain points emphasising in order that the pilot may compare the ground and map with as little difficulty as possible, but, generally speaking, the aerial photograph will be sufficient in itself to prove a reliable guide for travellers in aircraft.



FIG. 3.—THE GREAT PYRAMIDS TAKEN FROM AN AEROPLANE.
The wireless station on the top of Cheops's Pyramid is seen at the bottom of the picture.

One particular application of aerial photography, which will be of tremendous use to all pilots, is the provision of aerial photographs of all aerodromes on the international airways. It frequently happens that a plan, even on a comparatively large scale, does not give the pilot the information he desires, and particularly when landing by night on a strange aerodrome he is in great difficulties owing to his lack of knowledge of the landing area itself and the surrounding buildings and obstacles. An aerial map, possibly composed of only one photograph, will show him all details he requires in an instant, and he will experience little difficulty, even in darkness, in selecting a suitable spot at which to glide into the landing ground. The Air Ministry now issues periodically very detailed particulars of all aerodromes known to be in use throughout Europe, and frequently issues plans with the descriptions, but in no single case have aerial photographs been circulated, though in many cases these are available for inspection at the Air Ministry. The "Pilot Book" of civil airmen of the future will undoubtedly contain these photographs, together with other particulars which may be necessary.

During the war one somewhat peculiar use was found for aerial photography, which use may be of assistance to civil pilots when flying in bad weather. It was noticed that different areas had very distinctive types of country when seen from the air. Thus, certain parts of Flanders had the fields arranged, in the majority of cases, in the form of very regular rectangles. Farther south the fields altered somewhat in shape. In other parts, as in England, they were irregular and generally hedged or bounded by trees. Still other parts of the country were thickly wooded; others were mountainous. In all cases this distinctive character was found to extend over certain definite areas. Photographs of typical country were therefore taken and supplied to units, together with sections of the map showing the areas over which each type of country extended; notes were also supplied giving the "colour schemes" of the land. Pilots were then taught to memorise the geographical positions of the various types of country, so that if they were lost through flying for long periods above the clouds or in misty weather, they could gain some idea of their position when they saw the ground again by noting its characteristics. This idea might well be adopted for civil pilots, though under present conditions, when flying on the airways only takes place in fairly good weather, there is little possibility of a pilot losing himself. In the future this method may become of more use, particularly when many private owners use the airways, in addition to the regular pilots who fly only along certain routes.

The Biology of Coral Reefs

By F. A. Potts, M.A.

Lecturer in Zoology in the University of Cambridge

THE coral reefs of the tropics are the most characteristic assemblages of sessile animals in the world. They grow in such shallow and clear water that many a traveller is able to bring back an enduring impression of the beauty of these water gardens from some far-away harbour. And for a trained biologist the field offered for observation and experiment is without equal.

A Pacific coral reef, like that represented in the accompanying photograph (Fig. 1), gives the same idea of luxuriant life as a tropical forest. It is hard to realise that the corals which compose it are animals, and that they subsist entirely on animal food. Their peculiar physiological habit of excessive lime secretion, combined with their powers of vegetative reproduction, has enabled them to build, in the course of countless generations, these vast platforms throughout the tropic seas. In each colony there exists a living film, over the massive skeleton of carbonate of lime, composed of innumerable individuals, resembling, in the structure of their soft parts, tiny sea-anemones.

The variations in form of the skeletons of coral colonies are exceedingly striking and beautiful, and parallel every extravagant form of which plant life is capable. Not only do genera and species differ markedly, but within species the variability is so great that their determination is a matter of the greatest difficulty. How far the form of coral colonies is a reflection of the action of external forces such as the wash of the sea and the light of the sun is a problem which has engaged the attention of several biologists of late years. Particularly, since the foundation in 1904 of the Department of Marine Biology of the Carnegie Institution, intended to concern itself with the investigation of tropical seas, this and other problems of coral reefs have been attacked with vigour.

The fastidious nature of reef corals is a commonplace of zoological and geological textbooks. For vigorous growth the water must not be too deep, and they will not grow at all below 25 fathoms. The temperature must be uniformly high; the average for the coldest month of the year must not be below 22° C. They can only grow in the clearest ocean water, containing abundant supplies of small animal "plankton." If the water is at times considerably agitated, then the strongest and most rapid growth occurs.

Within these limits there is, however, a good deal of variation, and on a coral reef widely differing

environments are met with. At the edge of a reef which fronts the ocean the best growth conditions are attained. It may be supposed that the fresh ocean water brings rich supplies of animal plankton, which the coral polyps here are the first to sample and, as the water sweeps shoreward, it is robbed of a good share of the food it carries. A quantitative estimate of plankton over the various parts of the reef has not, however, been made.

Whatever the effect of the agitation of the water

live on the summit amongst the breaking waves, the hardy plant thrives. The edge of Indo-Pacific reefs commonly rises 18 inches or so above the rest of the reef on account of the vigorous growth, and is dry at spring tides. It is called the *Lithothamnion* ridge and is absent from the West Indian reefs.

On the seaward edge below the rim the mechanical effect of the waves is felt less and less, and 6 feet or so below, growth is luxuriant and unrestrained, the *Acropora*, of a different species, putting out such slender



Photograph by A. G. Mayor.

FIG. 1.—EDGE OF CORAL REEF IN PAGO PAGO HARBOUR, SAMOA.

[on the rate of growth, it certainly results in characteristic modifications of coral form. In the picture already alluded to the colonies of *Acropora* (= *Madrepora*) are shown with their spreading mushroom-shaped base and closely set stumpy branches, hugging the reef surface tightly and offering as little chance as possible to the disruptive force of the Pacific rollers. Many colonies die, but their form is preserved by an enamel-like coat of encrusting *Lithothamnion*—a calcareous plant. (Such colonies appear in the photographs as white patches.) This will grow, however exposed the position; and on coral pinnacles, where no corals

and graceful, or spreading branches, as are generally associated with their growth. This, too, is the effect always to be traced passing shoreward over the reef flat. The *Lithothamnion* ridge acts as a breakwater and protects the inshore corals from the full brunt of the waves. It also ponds back the seawater at low tide, so that on a fringing reef a gigantic shore pool extends between the reef edge and the sandy beach, of uniform depth, in which the numberless coral colonies flourish—resembling a series of low bushes with their tops reaching a uniform level of about 18 inches.

*

Mayor has made exact determinations of the abundance and distribution of the various species of corals by tracing a line across the reef from shore to edge and surveying squares of 50 feet along it. In each square the number of heads of coral was counted and classified according to species. A survey of this kind made at Murray Island on the Great Barrier Reef brought out many interesting points. It showed, for instance, that the greatest number of coral heads (belonging to eighteen species) was found about 200 feet behind the *Lithothamnion* ridge and about 1,400 feet from the shore, while the greatest number of species occurred on the ridge itself, though the number of colonies is smaller, many being broken off in time of storm. In the middle region of the reef, where growth is easy in the calm water and nutritive conditions good, there is a struggle between the various species for mastery, and one, *Seriatopora hystrix*, emerges as an undoubted victor, crowding out a number of others. Its zone of dominance is restricted, however, and else-

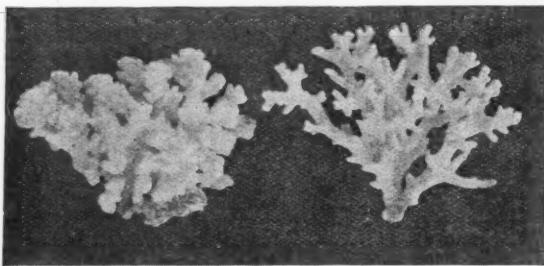


FIG. 2.—POCILLOPORA GROWTH VARIETIES.

where it never occurs. Toward the shore colonies become fewer and fewer with many gaps between, and it is found by experiment that they belong to the hardy species, which will stand exposure to overheating of the shallow water by the sun and suspended mud or sand from the adjacent shore. These, like some species of *Porites*, are very different, in this respect, from the more delicate corals of the middle region and reef edge. Some genera are distributed widely over the breadth of the reef, and in this case there are several species replacing each other, or, as in the genus *Pocillopora*, one very variable species. The photograph here given (Fig. 2) illustrates a colony with massive branches from the reef edge, and a looser delicately branching one from the quieter waters toward the shore, but both belonging to this species. Even more interesting than the correspondence to position is the effect produced in *Pocillopora* by a small crab (*Hapalocarcinus*) which associates itself with the coral particularly. The female, which attains the size of a pea, settles down between two growing buds and controls their growth by the current of water she sends out from her gill chambers. The two buds broaden

out to short palmate branches, quite unlike the ordinary slender forms, and curve over and unite to form a closed chamber about the size of a hazelnut, with small perforations serving for the passage of water and food, and kept from closing only by the prisoner's respiratory activity. The female crab is fertilised by the much smaller male before the "gall" closes, and sends out her numerous offspring through the pores. But, though the form of these curious structures reminds one strongly of vegetable "galls," yet there is no exact parallel between the two cases, for the crab works by directing the growth of the coral rather than stimulating the tissues to abnormal activity.

Experimental work on the growth of coral colonies has been conducted by Mayor for some years. The simplest of these are estimations of rates of growth. These are made firstly by taking a colony, photographing and weighing it, putting it on a cement base and attaching a numbered label. The colony is then replaced on the reef and, after a year or eighteen months, if a hurricane has not meanwhile removed all traces of the experiment, it is retrieved, photographed, and weighed again. Such experiments show a considerable rate of growth and confirm the statement made by Stanley Gardiner that in the Indo-Pacific region a reef 150 feet thick might be built in 1,000 years. But the growth rates obtained in the West Indies and the Pacific by the Carnegie Institution differ greatly. It may be said, in fact, that growth is roughly twice as rapid in the latter as in the former, but an explanation of this is yet to be made.

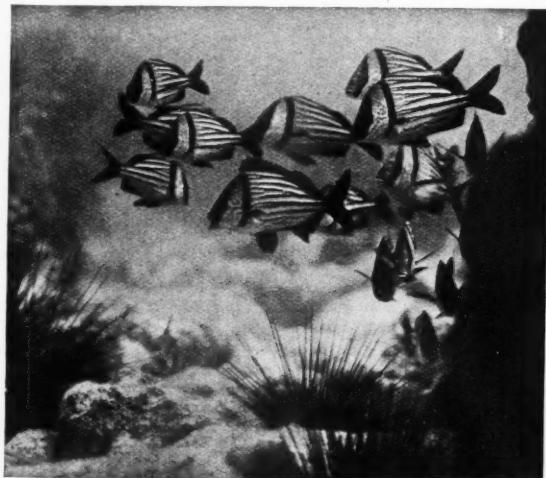
Another line of experiment is the transplantation of coral colonies from one kind of position to another, say from the reef edge to the quiet waters of a channel 20 feet below the surface. Some species, as one would expect, respond to such a change. After a few months it will be seen that their stumpy branches have put out slender shoots, and a remarkable difference may be noticed between the earlier and later parts of the colony, as if a different species had been grafted on the original stock. But in other species the response is limited or entirely absent.

Many observers have recorded the influence of the heavy rainstorms of the tropics on coral reefs. Such a one in May 1920 in Samoa, when 28 inches fell in thirty-six hours, washed down such loads of soil from the island hills into the harbour of Pago Pago that the water changed from dark blue to chocolate, and when it began to clear a thin film of mud coated over most of the coral heads and caused their death. Mud or silt has a selective effect. The brain corals (*Porites*, etc.) are as a rule able to resist its suffocating effects where *Acropora* and *Pocillopora* will perish. But in the case mentioned, huge brain corals, probably fifty years old, were killed and whole stretches of reef

devastated. Such exceptional instances explain the occurrence in the Pacific of reefs whose broad surface is strewn only with dead corals, with a few colonies beginning to work in again from the edge.

There is, apart from this, a marked difference to be traced between the oceanic shores of an island and those within a harbour or estuary where muddy invasions may be usually expected in the wet season. In the latter position the beautiful *Acropora* and the encrusting *Lithothamnion* are entirely absent. The massive brain corals and the flabby Alcyonarian corals (related to our "Dead Men's Fingers") are the dominant forms of such impoverished reefs, and these corals are provided with an efficient mechanism to get rid of the suspended mud which threatens to choke them.

Many interesting cases of distribution according to environment are to be found among the general invertebrate fauna of a coral reef. The wave-pounded edge would seem to offer a singularly ineligible shelter for any lodger, and yet characteristic forms are found there. The sea-urchin, *Heterocentrotus*, is widespread in the tropics, and a familiar but puzzling form in collections. Seen in its natural habitat, the meaning of its huge mace-like spines becomes apparent. They are pushed into tiny hollows and fissures of the coral blocks, and with the aid of the sucking "tube feet" are quite adequate to maintain the sea-urchin in position against a heavy wave and its backwash. Of

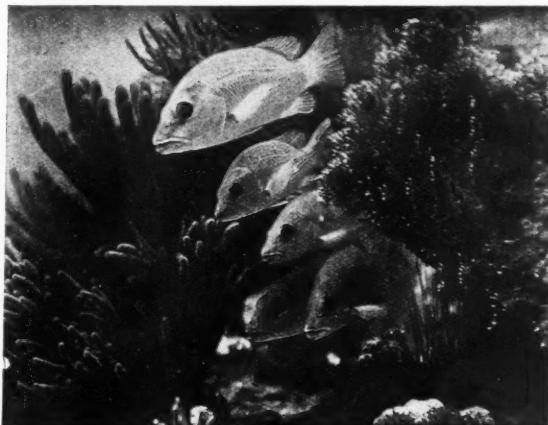


Photograph by W. H. Longley.
FIG. 3.—SCHOOL OF PORK FISHES, MASSIVE CORAL AND SEA-URCHINS (*CENTRECHINUS*), PORTUGAS.

entirely different appearance is the equally characteristic long-spined urchin, *Centrechinus*, which is found only at moderate depths or in the quiet pools of the reef (Fig. 3). The variations in the form of the spines

of urchins can be thus roughly compared with those of the corals themselves.

Of the active population of a coral reef, the fishes are without doubt the most interesting. Even the



Photograph by W. H. Longley.
FIG. 4.—SCHOOL OF *NEOMÆNIS GRISEUS*, PORTUGAS.

least thoughtful and speculative traveller is always excited to admiration by them, and indeed they seem such creatures of romance that it is shameful to subject them and their doings to scientific analysis. But coral reef fishes form a biological complex of the greatest interest. The credit of much careful pioneer work in the West Indies and the Pacific is due to Professor Longley, of Baltimore. He has gathered together a mass of information concerning their habits, their coloration and patterns, their conspicuousness against natural backgrounds, their food and many other matters.

A permanent record of many of these points has been secured by his remarkable underwater photographs, examples of which are shown amongst the illustrations to this article. A diving-hood worn over the shoulders and leaving the hands free to manage a camera enables Longley to work under water in the shallow reef channels for hours at a time. He is able to move about slowly to the limit of the 100 feet of rubber piping which connect him with the boat. Though a diver cuts a strange figure according to our terrestrial ideas, he does not seem so strikingly out of place in a submarine landscape. The fishes, which will fly from the shadow of the boat overhead, yet show little or no fear of this uncouth monster groping his way along, and do not suspend their pressing business for him.

The camera used for these photographs is a 5 x 4 inch "Autografex" enclosed in a watertight metal container. It is a bulky object to carry and takes immense patience to manoeuvre into position for an exposure, even when the fish are complacent "sitters."

Various screws and plungers serve the means of adjusting the shutter, focusing, and making the exposures. At a depth of 15–20 feet the light is often good enough to take a snapshot. The photograph of fish in motion (Fig. 4) shows what sharpness of definition can be obtained. But the excellence of the results tends to obscure the great difficulty of manipulation and the large series of failures through unavoidable accidents.

Clear though the water is, the almost impalpable floating organisms and particles make it a much denser medium than air and invest the colonies of corals, branching like trees or massive like crags, with an air of unreality. For this reason the background of the photograph rarely appears in focus.

I can only call attention to one or two of the more interesting observations on the habits of reef fishes. They are not a homogeneous population, but can be divided into sharply marked classes, according to their habits, the parts of the reef they frequent and, particularly, according to the periods of their activity. Some are strictly diurnal like the well-known parrot fishes, others confine themselves to the fissures of the reef by day, like the "squirrel fishes," but the rays of a torch cast on the water at night shows the surface boiling with them. The enormous eyes and golden-red colouring of these nocturnal kinds give them a family likeness to deep-sea fish. Then there is a large intermediate class, like the "pork fishes" (*Anisotremus*) of the illustration, which feed actively at night, as shown by an examination of their stomachs. During the day, however, they do not retire within the crevices, but lazily circle round some coral stack, without ever taking food, and only show signs of returning activity at twilight.

How remarkable their colour patterns are, the picture of *Anisotremus* shows. This happens to be a black and white fish, but the majority of the fishes rejoice in gaudy colours—a habit to which the parrot fishes owe their name. Many of them possess the faculty of colour change to a remarkable degree. In Samoa, for instance, Longley estimated that, out of 197 species which he had under examination, there were 56 able to change colour or pattern. This phenomenon may be easily observed in the few aquaria (like New York, Honolulu, or Madras) where tropical fish are housed, but it requires very patient observation in natural surroundings to estimate the value of these changes. In some cases they are, possibly, as Townsend maintains from his observations at the New York Aquarium, the reflection of the varying emotions of the fish. But for the most part, Longley concludes, the changes are associated with the position of the fish against different types of background, and afford the animal protection by rendering it inconspicuous. Tempting though it is to interpret the bold patterns and striking

colours as warning signs, quite the contrary is the case, for when seen in natural surroundings they blend with the background.

So much interest has been taken in the past in geological and geographical problems of coral reefs that their biological aspects are in some danger of being neglected. This article is intended to show something of the results which are repaying the research workers for their study in this comparatively new field.

BIBLIOGRAPHY

The following is a short guide to the literature on the biology of coral reefs.

The Great Barrier Reef of Australia. W. Saville Kent. (Allen, London, 1893.)

This is illustrated by the most splendid series of photographs of coral reefs ever taken and by indifferent coloured plates of fishes and other animals.

The Fauna and Geography of the Maldives and Laccadive Archipelagoes. J. Stanley Gardiner. (University Press, Cambridge, 1903.)

A great deal of information of reef biology is contained in Professor Gardiner's general accounts in the first volume.

Coral and Atolls. F. Wood Jones. (Lovell Reeve & Co., London, 1912.)

Corals and the Formation of Coral Reefs. Smithsonian Annual Report of 1919. Thomas Wayland Vaughan. (Washington, 1919.)

An excellent résumé of recent work.

Marine Camoufleurs and their Camouflage. The present and prospective significance of facts regarding the coloration of tropical fishes. Smithsonian Annual Report for 1918. W. H. Longley. (Washington, 1920.)

Papers from the Department of Marine Biology of the Carnegie Institute of Washington. By A. G. Mayor and Others. 1908 onwards.

The Flight from Reality

By F. A. Hampton, M.C., M.B.

IT is probably as much to that faculty that we loosely call imagination as to any other that man owes his supremacy in the struggle for existence, for by it he can make a picture of the future out of the experiences of the past and so obtain a kind of fore-knowledge of events which immensely increases his powers of adaptation and the range of his achievements.

But a certain price must be paid for this constructive power of thought with the knowledge that it gives of the possibilities of the future and the manifold and remote consequences of an action, for man may well find something a little daunting in the vision of reality opened up by his far-reaching consciousness and by the exquisite "awareness" with which it endows him. And this very business of adaptation to life is not always an easy matter, more especially in a civilised setting that has changed more rapidly than the nature

of man, who still carries with him an equipment of instincts necessary in a primitive mode of life but often difficult to utilise or satisfy in an environment that civilisation has sometimes made all too equable. A conflict is, therefore, liable to arise between the "pleasure-pain" principle of the primitive child-self that demands the satisfaction of its wishes forthwith and that more adult, civilised and social self that seeks "to adapt the organism to the exigencies of reality, to subordinate the imperious demand for immediate gratification, and to replace this by a more distant but more permanently satisfactory one."¹

But imagination comes to the rescue, and that faculty, which was evolved, we may suppose, to enable man to cope more effectively with reality, provides him with a ready means of escape from it by constructing a substitute, or a more genial version of reality.

The easiest escape is into the day-dream where the difficulties and handicaps that keep us from realising our desires are abolished and even the laws of time and space hold no sway. Here the effort of adaptation to life is abandoned and the problem solved—for a time—by adapting reality to ourselves.

A little introspection will show that day-dreams are commoner than we might be disposed to admit, and a real and valuable relief to tired or hurt minds, for the day-dream builds itself and is singularly effortless compared with that process of directed thinking—of thinking in order to act. The day-dream forms, we know, a large part of the mental life of the child, but there are few who leave it entirely behind, and we still build castles in Spain, the romantic country that provides also the "Spanish prisoner" to play upon our eternal day-dream of getting rich quickly.

Generally, our grown-up fantasies are somewhat prosaic; we recast the events of the day as we would have had them happen, or live in a future of personal or professional success. Sometimes these reveries justify themselves practically and "ideas come to us" that had escaped the pursuit of our more active thinking, ideas that were, perhaps, held back because our conscious self found them a little too bold or because the observations and feelings that gave rise to them were individually too faint and elusive to be recognised and formulated into a logical sequence; for man sets too much store by the efficiency of his reasoning powers to accept the end-product—the inspiration or intuition—when he cannot discover the process that led up to it. But if our day-dreams are prosaic, we can purchase something more elaborate from the artist who lives by his imagination (which is not to say that all literature is "dream-pedlary"), and we may realise our desires vicariously in romances of luxury or adventure or love.

¹ Ernest Jones. *Papers on Psycho-Analysis*. 2nd Edition, 3.

It is perhaps significant of a change in our national psychology that tragedy is no longer popular, that a happy ending to the drama is demanded. It seems as though the deep tragic note of the old ballads and folk-songs were no longer bearable and the robust enjoyment of Byronic melancholy or Victorian pathos an impossibility to the general public of to-day.

If the habit of reading were universal, the type of literature most popular might be expected to throw a good deal of light on the psychological needs of a people and the trend of their unconscious desires, but the public that reads imaginative literature is a comparatively small one, and a more ample reflection of these needs and desires may be found to-day in the cinema. Here the spectator is spared the trouble of conjuring up for himself a visual image out of the written words, and he can become, with a minimum of mental effort, a participant in that drama "silent like a dream" that is played out before him; and the drama is of his own choosing, for competition is keen and the producer is assiduous to supply the demand as perfectly as he can.

Naturally enough, the old type of melodrama is still popular, for it is reassuring to believe, even for an hour, that virtue in the end will be rewarded and vice suitably punished, and it may help a little to reconcile a man with the realities of a life in which these dramatic conventions do not seem to hold. If we are tempted to speculate upon the moral (or demoralising) influence of the cinema, it is well to reckon with this aspect of its melodrama in which we can almost see a literal fulfilment, here and now, of the promise of the Beatitudes.

But all film plays are not coloured by the high moral tone of the melodrama, for, on the other hand, we have the glorification of the successful criminal, a theme that has been popular since, to go no farther back, the days of Robin Hood or Dick Turpin. It has been said that every man is potentially a criminal, which is true in a way, since we begin life as pure egoists and our education consists to a great extent of a gradual subjugation of our personal desires to the interests of society, and, however philosophically we accept our citizenship, we still retain a trace of the primitive anarchism of the child. In the person of the criminal-hero the spectator escapes from the reality of his own moral restrictions and, for a brief while, usually with superhuman luck and agility, triumphantly defies society, and having, as it were, worked off his anarchism, is more likely to return with greater patience to his old submission to law and order than be tempted to any grandiose acts of rebellion.

There are certain themes that recur in myths and legends in many parts of the world and are also found in the fantasies and day-dreams of individuals, though,

since they spring from a somewhat deep level of the unconscious mind, they do not readily come to expression. Such a theme is found in the story of the hero, who is brought up in humble surroundings by foster-parents, coming into his rightful inheritance after he is grown up (i.e. Romulus, Siegfried, etc.), and it corresponds to a fantasy frequently found in children, in which the real mother and father are pictured as foster-parents, while imaginary ones, usually far more exalted and indulgent, are imagined to take their place. This fantasy probably arises out of the idealisation of the parents and the flight into day-dream from disillusionment when the child comes to see his parents as ordinary human beings after all.

This day-dream finds its counterpart in many film dramas where the hero turns out to be the heir to titles and fortune, wrongfully or ignorantly kept out of his heritage, and the spectator, living into the part of the hero, finds along the lines of his old day-dreams some compensation for, even in a measure, a fantastic explanation of, his own exclusion from the riches and power that people, no better than himself, possess.

A theme of similar, and perhaps identical origin, is that of the "hero in disguise," and Haroun al Raschid, the mighty Caliph wandering incognito in the streets of Baghdad, is the legendary figure nearest the modern type who appears in popular drama as a man regarded by his fellows as an ordinary or even negligible mortal, but who possesses some semi-magical power, great wealth or influence which he chooses to wield anonymously and in secret until the last act. Such a fantasy, though doubtless it has a deeper origin, may serve as a fantastic explanation of the discrepancy between a man's own opinion of himself and that held by others; such a fantasy when combined with great egoism may exert a sinister influence on the character and may possibly play a part in the psychology of the poisoner who is sometimes discovered to have added to his list of victims with an apparently wanton inadequacy of motive.

It is in this rôle of the hero in disguise that George Borrow frequently drew himself in "Lavengro" and "The Romany Rye," books that were at first projected as autobiography but to which he gave at one time the significant sub-title of "a dream," a description that may perhaps explain some of their wide, but not obviously explicable, popularity. Borrow also illustrates another line of escape from reality, into the past and the exotic, a mode of reaction from the environment to which archaeology and history are probably largely indebted.

But there was one way of escape of which Borrow, with all his mal-adjustment to life, could not or did not avail himself, and that was the way of humour, the attitude that throws down a kind of challenge to reality

by denying, or rather levelling down, its values. Perhaps the most thorough-going humorist in this way was that fisherman in Stevenson's fable ("The Poor Thing"), "bitter poor and bitter ugly," with his formula "that in my thought one thing is as good as another," on the strength of which he tried to obtain the King's daughter in exchange for an old horse-shoe that he had picked up in the road. The protective value of humour was very evident during the late war, and there was a fine courage in the attempt by combatants exposed to the worst horrors to treat them as a joke, and the attempt was often surprisingly successful. This levelling down of values seemed sometimes even to result in a truer perspective, for the "Hun" and "Boche" of the newspapers and the home front became simple "Fritz" and "Jerry" in the closer acquaintanceship of the front line, since, as one of their own poets has said :

"Dort wo der Tod am meisten droht,
Dort ist nicht Hohn und ist nicht Hass."¹
(*There where the threat of Death is greatest,
There is no room for hate or scorn.*)

This tendency of humour to belittle the values of reality contains, as do all modes of escape, a slightly retrograde trend, for if sufficiently acutely developed it becomes not easily compatible with any very great enthusiasm or even activity, and it is perhaps significant that it does not find its most obvious expression in those younger nations who are at closest grip with reality. This tendency of humour leads up to a complete denial of the intrinsic value of reality either by a philosophy or by an attitude of detachment from the "insubstantial pageant" of the world.

But the flight from reality sometimes carries farther, making a goal of Nirvana, whether imagined as annihilation or as a compromise in "stirless rest." This ideal, at such cross-purpose with life, has been the theme of much beautiful poetry, usually addressed to death, though perhaps more nearly expressed by Walter de la Mare when he says :

Somewhere there Nothing is ; and there lost Man
Shall win what changeless vague of peace he can."²

For, pessimistic though it may seem, it is probably not identical with a wish for death, since, when we come to examine it in the psychology of the individual, we seem to find it expressed as an unconscious wish to go back again to the beginning—

Before the birth of consciousness
When all went well—

¹ Anonymous. From an anthology of German war poetry *Der Deutsche Krieg im Deutschen Gedicht*. (Verlag Morawe und Scheffelt, Berlin.)

² "The Tryst," by de la Mare. *Poems 1901-1918*, vol. i.

rather than as a desire to make an end of life. So that there is a deep truth in that apparent paradox of Buddha's teaching that the way to Nirvana lies through life and not through death.

It is more especially the thinking type, the "tender-minded" type of William James, who has the inclination and the power thus to escape from reality, but there are indications that at least among the Western races the thinking type is becoming more common. The old symbols of authority and religion are no longer unquestionably accepted, but at the same time no new guiding lines have been found to take their place. There seems to be a general reconsideration of values and a profound disquieting psychological unrest.

BIBLIOGRAPHY

- J. C. Flügel, *Psycho-Analytic Study of the Family* (International Psycho-Analytic Press).
 Jung, *Psychology of the Unconscious* (Kegan Paul).
 Maurice Nicoll, *Dream Psychology* (Oxford Medical Publications).
 Franz Ricklin, *Wish Fulfilment and Symbolism in Fairy Tales* (Nervous and Mental Disease Publishing Co., New York).

New Light on the Piltdown Skull

By E. N. Fallaize

Hon. Sec. Royal Anthropological Institute

EVER since the discovery of fragments of a human cranium and jawbone at Piltdown in Sussex in 1912, a fierce controversy has raged over these interesting remains. So serious has been the division of opinion that in a recent textbook it has been stated that the Piltdown Skull affords evidence neither as to the date nor as to the character of early man in Europe. While it is unnecessary to take up such an extreme position, it has yet been desirable to recognise that many of the statements relating to early man, in so far as they depend upon the evidence from Piltdown, have rested upon a foundation of which the elements were not universally accepted as secure. Recently, however, an important contribution to one aspect of the discussion has done much to resolve these difficulties and, if it falls short of absolute certainty, has at any rate provided a more secure basis for future work.

Before proceeding to indicate the nature and bearing of this latest contribution to the subject, it is perhaps desirable to recapitulate briefly the circumstances of the discovery of the Piltdown Skull and the main points of difficulty to which they have given rise. In 1912 the late Mr. C. Dawson found, among

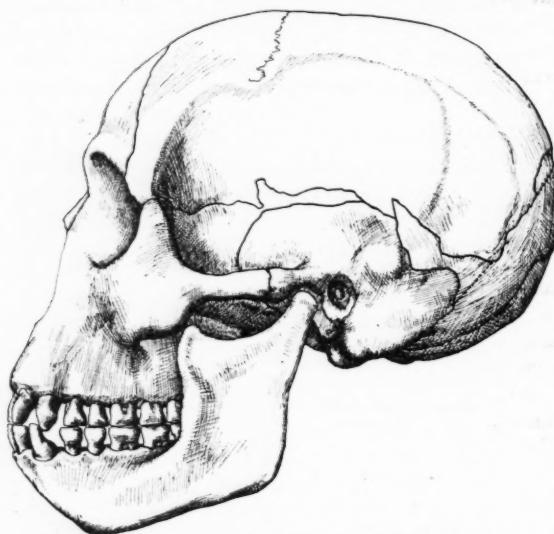
gravels which had been excavated by workmen, fragments of a human cranium, part of a lower jaw, a canine tooth from an upper jaw, flint implements of an early and a later type, and a chisel-like implement of fossilised bone of a mammal of elephant type which has not yet been more precisely defined.

In appraising the value of this discovery, the first difficulty encountered was that of the age of these relics of early man. While it was agreed that they were of high antiquity, it was not possible to assign to them with certainty any precise date. The jaw-bone alone was found in an undisturbed patch of gravel. The remainder were not found *in situ*: some lay as they had been thrown out by the workmen—the skull had been broken up in the course of the work—and others were on gravel heaps some little distance away. It was therefore impossible to say from which strata of the excavation these remains had been derived or whether they all belonged to the same stratum. A number of fragments of the bones of mammals belonging to the Pliocene Age were found. This fact, taken in conjunction with the occurrence of typical specimens of those early types of chipped flints which are regarded by some as man's handiwork, suggested that these were the remains of man of the Pliocene Age, the last phase of the Tertiary Period, and as such represented the earliest human remains found in this country. On the other hand, eoliths, those early so-called implements, afford no criterion of date and are themselves in need of support. Further, it was pointed out, the gravels were river gravels which had been deposited in their present position by running water. Some of the objects exhibited obvious traces of having been water-borne and, it was argued, the association of pliocene remains was probably the result of an early "wash-out." The occurrence of flakes of an early palaeolithic type supported a later dating. Accordingly high authorities, such as Professor Sir William Boyd Dawkins, refused to admit an earlier dating than the Pleistocene Age, the earliest period of the Quaternary, immediately preceding the age regarded by geologists as "recent." In taking this view they agreed with Mr. Dawson and Dr. Smith Woodward, the joint-authors of the original account of the discovery.

There for the present the question of dating stands. Failing further evidence, the case of the archaeologist for Pliocene man on this site must be held to be not proven. The counter-arguments are strong. Some time after the first discovery, Mr. Dawson found about two miles away two small fragments and a molar of a second skull of similar primitive character; but up to the present, further excavation at Piltdown has produced no fresh evidence in support of either

side. The acceptance of the Foxhall eoliths discovered in East Anglia by Mr. J. Reid Moir would attribute to man in this country an antiquity of possibly one hundred thousand years. It cannot yet be said with certainty that human remains of anything like that age have been found in this country.

In addition there was a second class of difficulties in connection with the human remains. What were the physical characters of the individual to whom they belonged? The evidence consisted of only a few fragments of the cranium and part of a lower jaw. It was not certain, though to be presumed, that they belonged to the same individual. Soon after the discovery, Dr. A. Smith Woodward and Mr. W. L. Pycraft, of the British Museum (Natural History), attempted reconstructions of the skull which confirmed



THE NEW RECONSTRUCTION OF THE PILTDOWN SKULL.

one another in a remarkable degree. From these reconstructions it appeared that the skull was low but of a remarkable breadth, being, in fact, broader than any other known skull; its capacity was low—under 1,300 cubic centimetres, which is considerably below the average of modern man. It was, however, typically human. In the case of the lower jaw there was a difference. Without going into technical details, it may be said that in the absence of chin, the character and disposition of the teeth, and in general conformation, it was distinctly simian, and might have belonged to an extinct form of chimpanzee. So great was the discrepancy that one school, which has received strong support in the United States, boldly declared that the fragments of the cranium and the jawbone were not related, but belonged to two individuals, of which one was human and the other an

anthropoid. While this is not impossible, the probability, in view of the circumstances, is against this close association of the remains of man and anthropoid; but the undoubted paradox of the typically human cranium and the simian jaw has proved a serious stumbling block to many anatomists of note. The accuracy of the reconstruction has accordingly been called in question.

Fresh light has been thrown on this question by the remarkable contribution to the subject to which allusion was made at the beginning of this note. A fresh reconstruction of the skull has been made by Professors Elliot Smith and Hunter. Their object was to obtain an endocranial cast, i.e. a cast of the inside of the skull, to form one of a continuous series of endocranial casts ranging from the gorilla to the highest type of modern man, in this case represented by Dean Swift. For their purpose a reconstruction of the skull was necessary, and it was determined to make this reconstruction afresh. To describe the method followed in full would involve great technical detail, which would here be out of place. Briefly, the relation of the fragments one to another was determined by a minute and careful examination of the anatomical points of each and by bringing these into their natural and inevitable disposition. For instance, two of the fragments had retained originally adjacent portions of the natural margins, which, though superficially obliterated in the adult, offer a natural line of fracture in a cranium subjected to violence. In other cases the lines of the sutures indicated the necessary position of the adjacent portion of the skull. As the result of endless experiment, a reconstruction has been built up which was exhibited and described at a recent meeting of the Anatomical Society. It is difficult to speak in terms of moderation of the skill and profound anatomical knowledge which have combined to the making of this reconstruction. The account of the method followed and the detailed description of the result there given carried complete conviction and produced the same effect as the contemplation of a finished work of consummate art.

The new reconstruction generally is confirmatory of the accuracy of the earlier reconstructions of Dr. Smith Woodward and Mr. Pycraft. It is low and broad and of a capacity below 1,300 c.c. It differs, however, in one important respect. The occipital fragment, which determines the shape of the back of the skull, assumes a more vertical position, and this, with the consequent modification produced in the conformation of other parts of the skull, has produced a form which more nearly resembles the anthropoid skull than that of modern man. The result, as Professor Elliot Smith pointed out, is a skull like no other

skull ; but its assimilation to the simian skull brings it into complete harmony with the chimpanzee-like jaw. The difficulty which arose from the discrepancy between cranium and jaw has thus been completely and satisfactorily resolved, while the endocranial cast, as might be expected, takes up its place between that of *pithecanthropus erectus*, the fossil skull from Java, and that of the recently discovered Rhodesian Man.¹

I am indebted to the kindness of Professors Elliot Smith and Hunter for the loan of the drawing of the reconstructed Piltdown skull illustrating this note.

The Fate of a Great Lyric Poet—I²

By Edward Liveing, B.A.

*The breath whose might I have invoked in song
Descends on me ; my spirit's bark is driven,
Far from the shore, far from the trembling throng
Whose sails were never to the tempest given ;
The massy earth and spher'd skies are riven !
I am borne darkly, fearfully, afar ;
Whilst, burning through the inmost veil of Heaven,
The soul of Adonais, like a star,
Beacons from the abode where the Eternal are.*

From Shelley's *Adonais*.

On July 8th, 1822, the greatest, perhaps, of all our lyric poets was drowned in a storm in the Gulf of Spezia off the north-west coast of Italy. The disaster promoted a large number of questions about which considerable discussion took place during the nineteenth century, but which have never been satisfactorily answered. The centenary of the tragedy affords an occasion for retelling the story of Shelley's last days, for drawing attention to some important points in that story, and for a fresh attempt to solve some of those points.

I

By 1822 the remarkable renascence of literature, which has been since named the Romantic Revival, had already reached its zenith, and it is significant that three of its youngest forces were removed almost simultaneously around this date—Keats, in honour of whom Shelley wrote the famous elegy, part of which is quoted at the beginning of this article, at Rome in '21, Shelley in '22, and Byron at Missolonghi, in the cause for Greek independence, in '24.

Shelley and Byron had first met in Switzerland in

¹ For further reading on this subject see *The Rhodesian Skull and the Antiquity of Man*, by E. N. Fallaize, in the January number of DISCOVERY.

² The authorities and materials on which this article is based are numbered in the list of references at the end of the article. In the footnotes the authority is referred to by its number in the list.

1816, and from then onwards the fellow-exiles, though never the closest of friends, had at intervals seen much of one another, notably at Venice and Pisa. In the winter of 1821 we find the Shelleys installed at Pisa in rooms at the top of the Tre Palazzi di Chiesa on the Lung'Arno, opposite the Casa Lanfranchi—the "palazzo" in which Byron, the beautiful Countess Guiccioli, his mistress, and her brother, Count Pietro Gamba, were living. The two households became the nucleus of a young, brave, brilliant and, in general, happy circle. To a flat in the same house as the Shelleys had come Edward Ellerker Williams, a young lieutenant on half-pay, late of the 8th Dragoons, and his pretty musical wife, Jane. Their literary tastes, Jane's charm of manner, and Edward's passion for the sea had endeared them to the Shelleys. The group was next joined by Edward John Trelawny, aged thirty, sailor, buccaneer, adventurer, a man of rugged strength, physically and mentally, of an impulsive yet magnificently loyal and generous nature, sufficient proofs of which will be shown in this narrative alone—altogether a fine product of old Cornish stock. He had arrived "to pass the coming winter in the wildest part of Italy, the Maremma, in the midst of the marshes and malaria, with my friends Roberts [Captain Roberts who was commissioned to build the ill-fated *Ariel*] and Williams ; keen sportsmen both—that part of the country being well stocked with woodcocks and wild fowl" ; and, "for the exercise of my brain, I proposed passing my summer with Shelley and Byron, boating in the Mediterranean."³

Early in February 1822 the circle proposed transplanting itself for the summer to Spezia, over sixty miles farther up the coast. Williams and Shelley found what they considered some suitable houses at Spezia. Meanwhile, before the move was effected, an unfortunate incident occurred on March 24th, the importance of which in relation to the disaster of July 8th has, I think, been overlooked by Shelley's biographers. Late in the afternoon Byron, Shelley, Trelawny, Captain Hay, Count Pietro Gamba, and a certain Taaffe were returning to Pisa on horseback from one of their customary "pistol" parties, when a dragoon, a certain Sergeant-Major Masi, bound apparently on an official errand, rode through them, nearly knocking Taaffe off his horse. What followed is best narrated in the words of Williams,⁴ who happened to be in Pisa at the time and to whom Trelawny gave an account of the affair a few hours later :

"Lord B. put spurs to his horse, saying that he should give some account of such insolence. Shelley's horse, however, was the fleetest, and coming up to the dragoon he crossed and stopped him till the party arrived, but

³ Ref. VIII. Pp. 10-14.

⁴ Ref. IX. Entry of March 24th.

they had now reached the gate where a guard was stationed, and finding himself so well supported, he drew his sword, and after abusing them all as cursed English (*maledetti Inglesi*), began to cut and slash to the right and left, and what signified it to him if he had the blood of all the English robbers—saying he arrested them all. ‘Do that if you can,’ said Lord B., and dashed through the guard with young Count Gamba, and reached home to bring arms for what he expected would turn to a serious scuffle. The dragoon, finding the rest of the party intended to force their way, made a desperate cut at Shelley, who took off his cap, and warding the blow from the sharp part of the sabre, the hilt struck his head and knocked him down, when Captain Hay parried with a cane he had in his hand, but the sword cut it in two, and struck Captain Hay’s face across the nose. A violent scene now took place, and the dragoon tried to get into town and escape, when Lord B. arrived, and half drawing a sword-stick to show that he was armed, the fellow put up his sword and begged of Lord B. to do the same. It was now dark and, after walking a few paces with Lord B., he put his horse into a gallop and endeavoured to get off, but on passing Lord B.’s house, a servant had armed himself with a pitchfork, and speared him as he passed. He fell from his horse and was carried to the hospital. His wound is in the abdomen.”

Of Byron’s share in the fracas we have his own account,¹ the latter part of which runs as follows : “ He called out the guard at the gates to arrest us (we being unarmed) ; upon which I and another (an Italian) rode through the said guard, but they succeeded in detaining others of the party. I rode to my house and sent my secretary to give an account of the attempted and illegal arrest to the authorities, and then, without dismounting, rode back towards the gates, which are near my present mansion. Half-way I met my man vapouring away and threatening to draw upon me (who had a cane in my hand, and no other arms). I, still believing him an officer, demanded his name and address, and gave him my hand and glove thereupon. A servant of mine thrust in between us (totally without orders), but let him go at my command. He then rode off at full speed ; but about forty paces further was stabbed, and very dangerously (so as to be in peril), by some *Callum Beg* or other of my people. . . I need hardly say without my direction or approval. . . Who wounded him, though it was done before thousands of people, they have never been able to ascertain, or prove. . . They have arrested and examined servants and people of all descriptions, but can make out nothing.”

¹ Ref. II. Letter 491. Pisa, May 4th, 1822. To Sir Walter Scott.

For a considerable period after this incident Pisa was in an uproar. Masi eventually recovered. The authorities did not take action against Byron personally or any members of his party, but they imprisoned two of his servants. The citizens appear to have been somewhat divided in their attitude to the “ Inglesi.” Some openly expressed their admiration of their bravery by doffing their hats to them during the following weeks whenever they saw them riding through the streets. But there is no doubt that a violent undercurrent of feeling against the English colony had been aroused. Medwin,² who had himself been at one time a member of the “ pistol-club,” recorded that, “ although the wounded man recovered, his friend vowed vengeance with the dagger not only on Lord Bryon, but on Shelley, and all the English who had formed the cavalcade,” and that “ Lord Byron was advised by the police to quit Pisa for a time. He complied and took a villa at Montenero, near Leghorn ; but after a six weeks’ abode there returned to the Casa Lanfranchi.”

Masi himself certainly harboured revenge. He was no coward, and he appears to have possessed a strong will of his own. He had fought in several campaigns and received decorations for valour. He refused to take money from Byron, when it was offered to him. On March 26th Williams³ made this entry in his diary : “ It is a singular circumstance that an affair of a similar nature occurred to one of this man’s brothers, and, having been cured of a wound which he had received in a scuffle, he waited concealed for the person whom he suspected, stabbed him to the heart and flung him into the river.” Further, on April 7th, he notes that the “ dragoon is recovering fast, but swears to be revenged when he gets on his legs again.”

I have dealt at some length with this incident and the hostility which it produced, because, as I hope to show, its significance cannot be disregarded in the light of later events.

II

On April 15th it transpired that the houses at Spezia which Shelley and Williams had discovered were not to be had at any price. But a house was found on the eastern side of the small bay. The Casa Magni, into which the Shelleys and Williamses moved on April 26th, was perhaps the wildest and strangest of the many strange dwelling-places that the poet inhabited. Mrs. Shelley⁴ has left a vivid account of the house (which is still standing), and of its surroundings : “ The Bay of Spezia is of considerable extent, and divided by a rocky promontory into a larger and smaller one. The town of Lerici is situated on the eastern point, and in the depth of the smaller bay, which bears the name of

² Ref. VI. P. 380.

³ Ref. IX.

⁴ Ref. VII. P. 670. Note on poems of 1822.

this town, is the village of San Terenzo. Our house, Casa Magni, was close to this village ; the sea came up to the door, a steep hill sheltered it from behind." The proprietor of the estate, who was insane, had rooted up the olives and planted forest trees on the hillside. "These were mostly young," continues Mrs. Shelley, "but the plantation was more in English taste than I ever elsewhere saw in Italy ; some fine walnut and ilex trees intermingled their dark mossy foliage, and formed groups which still haunt my memory, as then they satiated the eye with a sense of loveliness. The scene was indeed of unimaginable beauty. The blue extent of waters, the almost landlocked bay, the near castle of Lerici shutting it in to the east, and distant Porto Venero to the west ; the varied forms of the precipitous rocks that bound in the beach, over which there was only a winding rugged footpath towards Lerici, and none on the other side ; the tideless sea leaving no sands nor shingle, formed a picture such as one sees in Salvator Rosa's landscapes only. Sometimes the sunshine vanished when the sirocco raged. . . . The gales and squalls that hailed our first arrival surrounded the bay with foam ; the howling wind swept round our exposed house, and the sea roared unremittingly, so that we almost fancied ourselves on board ship." This must certainly have been the case, for the porch and terrace open on to the sea, which frequently penetrates the first floor.

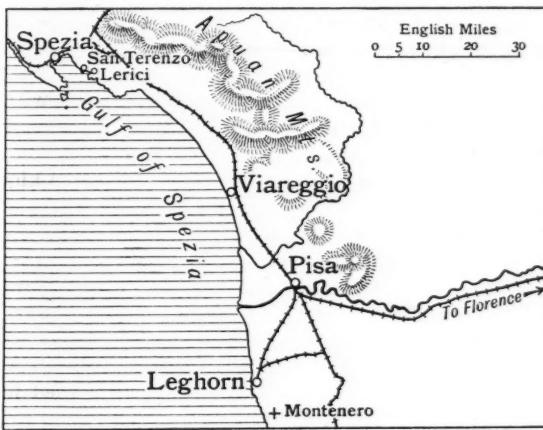
But as the days wore on into summer the heat became intense, and the sea and the cool breezes rising off it were more than welcome. Shelley and Williams spent most of their time on the bay in the *Ariel*. Some while before their departure from Pisa the two friends had commissioned Captain Roberts (already mentioned) to have a boat built for them at Genoa, where Byron was building his yacht, the *Bolivar*. The *Ariel*¹ arrived on May 12th, and the joy with which the ill-fated boat was received may be aptly paralleled to that with which the wooden horse was greeted by the Trojans. She was twenty-eight feet long by eight feet wide, deckless, ketch-rigged, strongly built, and carrying plenty of sail. But she had some dangerous defects, notably the lack of decks. Professor Dowden² has pointed out : "The model, obtained from one of the royal dockyards, had been brought by Williams from England, and he had insisted against Trelawny's advice and that of the builder at Genoa, that his model should be closely followed. . . . 'It took,' says Trelawny, 'two tons of iron ballast to bring her down to her bearings, and then she was very crank in a breeze, though not deficient in beam.' "

¹ Byron had had the name *Don Juan*, "in his contemptible vanity," as Williams called it in his journal, painted on the mainsail. The name was eventually cut out of the canvas, and the boat rechristened the *Ariel*.

² Ref. IV. P. 549.

III

It was on the *Ariel*, floating over the sultry waters of the Mediterranean, that Shelley wrote most of his last long poem, *The Triumph of Life*. The uncompleted fragment mirrors a restless and uncertain state of mind, and it will not be irrelevant here to consider the psychological change which was beginning to affect the poet, for the questions have often been asked, "Would Shelley, had he lived, have produced greater poetry than even the work of his twenties ? Or was his genius on the wane ?" External circumstances must have played their part in this change. Foremost amongst these was the death of Allegra (Byron's natural daughter by Claire Clairmont), to whom Shelley was devoted, in the Roman Catholic convent of the Romagna ; a growing dislike for Byron on account of the circumstances under which the child had died,



MAP OF THE GULF OF SPEZIA.

and for several other reasons ; the dangerous state of Mary Shelley's health ; a strong attachment to Jane Williams, which he had to check by reason of his loyalty to his wife and his friend.

During the last few months of his life he was constantly troubled by dreams and visions. On May 6th, a few nights after Allegra's death, he was walking on the terrace of Casa Magni, "observing" in company with Williams³ "the effect of moonshine on the waters," when he became very agitated and "declared that he saw as plainly as he then saw me [Williams], a naked child . . . rise from the sea and clap its hands as in joy smiling at him." Again, on the night of June 22-23 he had a nightmare in which "he dreamt that, lying as he did in bed, Edward and Jane Williams came in to him ; they were in the most horrible condition—their bodies lacerated, their bones starting through their skin, the faces pale yet stained with blood ;

³ Ref. IX. Entry for May 6th.

they could hardly walk, but Edward was the weakest and Jane was supporting him. Edward said, 'Get up, Shelley; the sea is flooding the house, and it is all coming down.' Shelley got up, he thought, and went to the window that looked on the terrace and the sea, and thought he saw the sea rushing in. Suddenly his vision changed, and he saw the figure of himself strangling me [Mary Shelley], that had made him rush into my room; yet fearful of frightening me he dared not approach the bed, when my jumping out awoke him, or, as he phrased it, caused his vision to vanish.' Another vision which he experienced about this time was that of meeting a figure of himself on the terrace of Casa Magni, which said to him, "How long do you mean to be content?"¹

On June 18th we find the poet writing to Trelawny,² who was still at Pisa, "should you meet with any scientific person capable of preparing the *prussic acid, or essential oil of bitter almonds*, I should regard it as a great kindness if you could procure me a small quantity. . . . I need not tell you I have no intention of suicide at present, but I confess it would be a comfort to me to hold in my possession that golden key to the chamber of perpetual rest." There lay something more than a gesture, too, in the poet's suggestion to Jane Williams, who had, one afternoon, entrusted herself and her two babies very rashly to Shelley's handling of a skiff, when they were some way out from land, "Now let us together solve the great mystery."³

From early days Shelley had possessed a passionate love for water and the sea. Torrents dash down to mingle their waters in the ocean, storms rage, or silver boats float over placid seas in nearly all of his long poems. References to the sea creep into his most beautiful lyrics—the *Ode to the West Wind*, the ode *To Night*, *The Cloud*, etc. But the poems of 1821 and 1822 show an almost morbid concentration on the sea. Before examining this development further, we must consider the allegorical purport of *The Triumph of Life*, which has been admirably expressed by Professor Dowden.⁴

"The poem," he says, "contains the promise for Shelley's poetry, and perhaps for Shelley's life, of a reconciliation between his pursuit of the ideal and his dealings with actual events and living men and women. The triumphal car of life rolls forward in Shelley's vision amid the mad troop of those who hasten they know not whither; while, bound to the conqueror's chariot, are the world-renowned captives, who, for any lure that life can offer, had yielded up their freedom, or, having fought a vain fight, had been defeated. But all are not there, either in that fierce and obscene

¹ Ref. IV. Pp. 560-561, which contain Mary Shelley's account.

² Ref. XIII. P. 84.

³ Ref. VIII. Pp. 90-91.

⁴ Ref. IV. Pp. 553-554.

crowd or among those melancholy captives. Socrates is not there; nor is Jesus. To know one's self, and to know the Highest, this and this alone makes it impossible that life should ever defeat us or deceive. For, knowing these, we shall know the world, and temper our hearts to its object, loving well, yet wisely, not with the self-abandoning passion of Rousseau, not even with the purer and loftier error of Plato. . . . Henceforth he would be on his guard against the errors of love—against identifying any mortal object with that for which alone man's being is made; he would love what he had found best and truest in life; but even this with a knowledge that it is not the absolute, and with a touch of renouncement in his adhesion."

I think that it must be fairly obvious to anyone acquainted with Shelley's biography and work that his attitude to life during 1821 and 1822 was changing from a destructive, anarchistic one to one that was more human and constructive. He was tending to accept life more philosophically, he was beginning to trust instead of distrust that *élan vital*, as Bergson has called it, that seems to guide the world and the individual. But he was only *beginning* to do this, and the struggle against giving up his old self was very violent and had reached its crisis just about the time of his death. I laid emphasis a short way back on the almost morbid fascination which the sea was beginning to exercise upon him. This was not entirely due to his close proximity to it; a great part of his life had been spent near the sea. Now recent psychological research has revealed the fact that some individuals experience marked changes in personality at certain periods of life. The first changes come, of course, during adolescence; the second usually in the early thirties; and so on. During such a change the individual has, so to speak, to die and to be reborn. Frequent phenomena connected with the change are dreams of putting out to sea, or difficulties experienced in doing so. When the dream occurs in which the individual finally puts out to sea, leaving all the ties of his old self behind him, it is fairly certain that he has at last trusted himself to his new self and to the changed currents of his life. We are here faced with a problem in the case of Shelley which only a trained psychologist could successfully tackle in full detail. Yet here we have a man in his thirtieth year, mentally more mature than his age in certain respects, experiencing dreams in which he is both attracted to the sea and at the same time afraid that it will overwhelm him, and in which he meets the figure of himself, asking him, "How long do you mean to be content?" I do not wish to force conclusions, but for further evidence I would refer the reader to the fragments written in 1821—*A Wanderer*, *Life Rounded with Sleep*, *Great Spirit*—and to the poems of 1822, expressive of an intensifying

desire to pass beyond the "sandhills of the sea" down to where

the multitudinous
Billows murmur at our feet,
Where the earth and ocean meet,
And all things seem only one
In the universal sun.

I believe that Shelley, had he lived, would within a year or so have embraced his new self, embraced humanity, and matured into one of our greatest writers of dramatic poetry, in which direction ample proof of his ability lies in the *Cenci*.

IV

From these conjectures we must return to our narrative. The summer of 1822 was one of the hottest and driest that visited Italy in the nineteenth century. Towards the end of June prayers were being offered up in all churches for rain; at Parma the labourers could only work in the fields before ten o'clock and after five; early in July religious processions wended through the countryside, interceding for rain. On June 19th the Shelleys heard that Leigh Hunt and his family had reached Genoa. He had come out from England to co-operate with Byron and Shelley in producing a new review. With the acrimonious discussion concerning Byron's treatment of Hunt over this review we have no space to deal.

On July 1st Shelley and Williams sailed across the Gulf of Spezia to meet Hunt at Leghorn and to settle him and his family into the ground-floor of Byron's *palazzo* at Pisa. The journey was safely and quickly accomplished, as was its object. But unfortunately the Gambas and Byron had become involved in another fracas at their new villa at Montenero¹ outside Leghorn. For this the Gambas had been banished by the Government from Tuscany, and Byron was considering whether he would follow them into exile. Such a step would entail leaving Leigh Hunt and his projects at Pisa, and Shelley spent most of the subsequent week in attempting to bridge the growing estrangement between the poet and the literary critic. He was largely successful in this, and secured for Hunt's first number the copyright of Byron's *Vision of Judgment*. Hunt and Shelley parted happily on the night of the 7th, at Pisa, the poet taking with him in his post-chaise to Leghorn Hunt's copy of the last volume of Keats' poems, which he was to keep "till he gave it to me with his own hands."²

V

The weather on the morning of July 8th was uncertain. It looked as though a thunderstorm was blowing up to put an end to the long period of drought. But the storm passed away, and the intense sun shone once

more out of an almost cloudless sky. Something of prophetic irony lies in the fragment written by Shelley a few months earlier:

When soft winds and sunny skies
With the green earth harmonize,
And the young and dewy dawn,
Bold as an unhunted fawn,
Up the windless heaven is gone,—
Laugh—for ambushed in the day,—
Clouds and whirlwinds watch their prey.

It should be noted here that on the day before Byron had lent Shelley £50. This fact has just been brought to light by the newly-published letters of Byron.³ This note of hand, as I conclude, was cashed at Messrs. Webb & Barry's, at Leghorn, on the forenoon of the 8th, and is the transaction referred to by Trelawny⁴ when he says that "I went with Shelley to his bankers, and then to a store." Webb & Barry were Byron's bankers, and they probably acted for Shelley as well. The £50 "were on board in cash when the boat went down." (Byron's letter already referred to.)

About three o'clock the *Ariel*, with Williams, Shelley, and their young English sailor-lad, Charles Vivian, on board, set sail for San Terenzo. Trelawny had intended to accompany them into the offing on the *Bolivar*, but was prevented from doing this by the officer of the Health Office, as he had not got his port clearance. Instead, he was left behind watching the progress of the *Ariel* through a ship's glass. His Genoese mate remarked to him, "They should have sailed this morning at 3 or 4 a.m. instead of 3 p.m. They are standing too much inshore; the current will set them there." Trelawny replied, "They will soon have the land-breeze."

"'Maybe,' continued the mate, 'she will soon have too much breeze; that gaff topsail is foolish in a boat with no deck and no sailor on board.' Then, pointing to the S.W., 'Look at those black lines and the dirty rags hanging on them out of the sky—they are a warning; look at the smoke on the water; the devil is brewing mischief.'"⁵

Gradually the *Ariel* became enveloped in a sea-fog. The air turned extremely sultry, and Trelawny retired into the cabin and went to sleep. Meanwhile "Captain Roberts had also kept the boat in view. Standing on the end of the mole, he saw her going at about the rate of seven knots. Anxious to know how she would weather the storm which was visibly coming from the Gulf, he got leave to ascend the lighthouse tower, whence he could still discern her about ten miles out at sea, off Via Reggio, and he could perceive that they were taking in the topsail; then the haze of the storm hid them, and he could see them no more."⁶

¹ Ref. V; and Ref. II. Pp. 565-566.

² Ref. V.

³ Ref. III. Pp. 228-229.

⁵ Ref. VIII. Pp. 106-107.

⁴ Ref. VIII. Pp. 106.

⁶ Ref. IV. P. 668.

Trelawny did not reawake till half-past six, and, when he did, it was to the mingled noises of ships shifting their berths, hastily shouted commands, the creaking of anchor chains, and suddenly above everything else the "crashing voice of a thunder squall that burst right over our heads." By then the fate of the *Ariel* had already been sealed.

(To be concluded in the August number)

REFERENCES

- I. Biagi, Dr. Guido. *The Last Days of Percy Bysshe Shelley*. (T. Fisher Unwin, 1898.)
- II. Byron. *The Life, Letters, and Journals of*. Edited by Thomas Moore. (John Murray, 1920.)
- III. Byron. *Lord Byron's Correspondence*. Edited by John Murray, C.V.O. Vol. II. (John Murray, 1922.)
- IV. Dowden, Edward. *The Life of Percy Bysshe Shelley*. Chapters XXIII and XXIV. (New and abridged edition, Kegan Paul, Trench, Trübner & Co., Ltd., 1920.) For the details of Shelley's last days the new edition is as serviceable as the two-volume 1886 edition. This admirable work still remains the standard biography.
- V. Leigh Hunt. *The Autobiography of*. (Smith Elder & Co., Ltd.)
- VI. Medwin, Thomas. *The Life of Percy Bysshe Shelley*. With an Introduction and Commentary by H. Buxton Forman, C.B. (Humphrey Milford: Oxford University Press, 1913.)
- VII. Shelley. *The Complete Poetical Works of*. Edited by Thomas Hutchinson, M.A., and including Mary Shelley's notes. (Oxford Edition. Henry Frowde: Oxford University Press.)
- VIII. Trelawny, E. J. *Records of Shelley, Byron, and the Author*. (George Routledge & Sons, Ltd., The New Universal Library.) First published in 1878, this book is a fuller record than the *Recollections of the Last Days of Shelley and Byron*, first published in 1858.
- IX. Williams, Edward Ellerker. *Journal of*. With an Introduction by Richard Garnett, C.B., LL.D. (Elkin Mathews, 1902.)

These references are to the latest and cheapest editions of books, so far as the author knows. Further references will be given at the end of the second instalment of the article.

New Year Decorations in China

By the Rev. C. W. Allan

VISITING China at New Year time, one's attention is attracted by the prevalence of paper symbols and pictures to be seen pasted everywhere on the doors and walls of the houses. A description of some of the more common decorations may not be without interest to our readers.

On the door of almost every house may be seen a single large character, the meaning of which is

"happiness." The shape of this character is now familiar to many Western people, being very often used by silversmiths in the making of brooches and buckles. It is a character that is used on every available occasion, to express the paramount wish of the Chinaman—a desire for material blessing. It is the character most commonly recurring in the other mottoes and sentences that are used at this time, pasted in all sorts of positions, and meeting the eye at every turn. Of these, the most common are, "May Happiness descend on us from Heaven," "To Dwell in Peace is Happiness," and "May the Five Blessings come to this House." This last sentence is a favourite one, and the sentiment expressed is a wish for unalloyed pleasure to be extended through life. The "Five Blessings" are Old Age, Wealth, Health, Love of Virtue, and a "Natural Death." The character for a "bat" having the same sound as the one meaning "happiness," it often happens that over doorways are to be seen figures in the plaster moulding of bats flying with outstretched wings, indicating the same sentiments as the written characters.

Another very common expression is to be found written on red paper and pasted up opposite the door of a dwelling. This may be translated, "May wealth spring up before me," an indication of the Chinese desire ever in evidence, to be quickened into life each time the door is passed.

The doors of Chinese houses are generally made with two leaves, which, when closed, have an interstice down the centre of the doorway. On New Year's Eve this is partly covered over with a piece of red paper on which is written, "May good luck attend the opening of the door." In the morning, when the door is opened, the paper, of course, is split.

Over every door are hung five pieces of red paper that have been elaborately cut and shaped by hand during the later days of the old year. These are called "door money." In the twelfth month, any number of men can be seen on the street, with stalls for the sale of pictures and paper, who during the hours of business cut out these lengths of paper with small awls or chisels. There are five in a set, and they are supposed to represent the five blessings mentioned above. There are many styles of these, the best being exceedingly pretty and effective. Not only is the paper cut into designs, but characters and pictures are also pasted upon them. Many have characters in gilt paper with this sentiment: "May I be exalted at an early date."

Perhaps, to the uninitiated, the figures pasted on the doors of Chinese houses are of most interest. These are the "door gods" or guardian deities of the homes. Almost every door possesses a pair of

now often and every wish is granted." "The last month is the time when the dead are honoured, and the last month is the time when the dead are honoured." "The last month is the time when the dead are honoured, and the last month is the time when the dead are honoured." "The last month is the time when the dead are honoured, and the last month is the time when the dead are honoured."

these energetic and somewhat fierce-looking individuals. These worthies were originally soldiers, who for their services to their country were canonised by a grateful people.

A very popular picture is that of the Chinese unicorn, one of the four fabulous animals of this country. It is depicted as having only one horn and a body covered with scales. For several thousands of years it has not been seen by mortals, except once by Confucius in his old age. . . . It is the symbol of all goodness and benevolence. It is supposed to walk without treading on any living thing, not even on living grass. Its horn is covered with flesh, showing that, though able to fight, it desires peace. Two distinct ideas seem to be present in the popular mind with regard to this animal, and they are expressed in the pictures at New Year time. One idea is that this famous animal brings sons to the deserving, and is, therefore, popular with the women. These pictures, pasted on the doors or other parts of the house, are an expression of desire for such happiness to be granted. They generally represent the unicorn in the act of bringing a small child, whilst behind is seen a boy carrying a banner on which is inscribed the words, "The unicorn brings children," or "The heavenly unicorn gives sons." The second meaning of the unicorn's appearance, also expressed in the pictures, is that the children brought give marks of unusual talent and of future promise as scholars or officials. At the feast of lanterns in the first month, a kind of lantern representing a boy riding a unicorn is sold in great numbers. To buy one of these and present it to a friend is equivalent to saying, "May you have a clever son."

Everyone has heard of the ancestral tablets of China. These are pieces of wood, on which are written the names of the deceased ancestors of families, and which are worshipped periodically as an expression of filial love and respect. There are two kinds used, one containing simply the names of the immediate ancestors, and another on which are written characters that refer also to heaven, earth, the Emperor, parents and teachers. In a well-to-do family the latter tablet especially is an elaborate one, polished and gilded. But in the homes of the common people the tablets are simply slabs of painted wood, with characters inscribed as stated above, and devoid of ornamentation. In the poorest families, however, wood is too dear a thing to buy, and so paper is used. These paper "tablets" are pasted on the walls or boarding of the house, and do duty for the more substantial things of the wealthy. When paper is used, one sheet is sufficient for the two classes of tablets. In the majority of cases, the large characters representing heaven, earth, etc., are written down the centre,

and the names of the ancestors by the side. At New Year time, when the houses are cleaned and decorated, it is the proper thing to paste up a new paper "tablet."

Besides the ancestral tablet, there is also to be found in every home a smaller tablet to the god of the kitchen. This deity is supposed to take notice of the actions of every member of the family during the year. During the last month he rises to the presence of the Jewelled Emperor in the skies and acts the part of a recorder of good and evil deeds. The ceremony of sending him on his journey consists of worship with a feast of vegetarian diet, one of the eatables being sugar or sweet soup. Some of this is smeared on the lips of the god, and is supposed either to stick his lips together, or to gratify his taste to such an extent that he cannot or will not tell all he knows about the family.

Perhaps the most popular of Chinese gods is the Ts'ai Shen, or God of Wealth. Every shopkeeper, banker, and merchant has a place in his establishment for an image or some representation of this deity. The most common form is simply a tablet or sheet of paper, on which are written the characters for the "god of wealth." Incense is daily burnt before this deity, and he is supposed to bring wealth to every sincere worshipper. Amongst the pictures sold at New Year are, of course, found those of this popular god.

Another favourite picture is used as a means of driving away evil spirits. The figure is that of an old man who lived in the eleventh century B.C., and who became chief counsellor to Wen Wang, the first Emperor of the Chou Dynasty. He is known as Chiang Tai Kung, or perhaps better still as Chiang Tzu Ya. Wen Wang became acquainted with him in the following manner. One day, when out hunting, he was told by some trick of fortune telling that his quarry would be none of the usual animals but a "Prince's teacher." He fell in with Chiang, then eighty years old, who was fishing with a straight piece of iron, instead of a hook, upon which the fishes allowed themselves to be caught. Wen Wang realised that this man was the one who should be his counsellor, and so took him home in his chariot. He is spoken of by Chinese historians as having authority over unseen spirits. On this account a picture of the old gentleman is often put up above the window or door of a house with this inscription: "His Excellency Chiang is here; of nothing need we be afraid." Where pictures are not available, these or similar words are written on red paper and pasted up.

Some of our readers will be familiar with an octagonal figure composed of small straight lines, in the centre of which are two signs of the appearance of tadpoles

closely interwoven with each other. This is known as the *Pa Kua*, or Eight Diagrams. It, also, is used for frightening away evil spirits. These diagrams are said to have been invented two thousand years before the Christian era by the Emperor Fu Hsi, who copied them from the back of the tortoise. Each diagram represents some power in nature, such as fire, water, etc. The centre of the circle is known as the Ying Yang, and is supposed to represent the primeval forces from which all things have been produced. Pieces of board on which are painted these diagrams are often to be found over the doors or on the walls of houses, and are supposed to have a beneficial influence on the household by warding off all evil. At New Year time many of these diagrams are sold, and they are also to be found on the other pictures of gods and men.

The favourite goddess of the women in China is Kuan Yin or, as she is sometimes called, Kuan Shih Yin, the "Goddess of Mercy." She is the deity who is supposed to be always on the lookout for people in circumstances of trouble and suffering, and ever ready to hear the cry of the oppressed. She is specially popular with the women, as she is supposed to respond readily to the appeal for sons which Chinese women always make, as daughters are of little account in that land. In the temples Kuan Yin is sometimes represented as having a thousand arms, each arm being stretched out to succour the unfortunate. Closely allied with Kuan Yin is the figure of the Buddha, which is also a popular one. There are many representations of this deity as he is supposed to appear in different forms.

Amongst the numerous pictures exposed for sale at the New Year, one would naturally expect to find an almanac, seeing the Chinese are so advanced in the study of astronomy and astrology. There are many kinds to be bought, from the elaborately prepared book down to the simple sheet. The almanac holds an important place in China. It is annually prepared at Peking under the direction of a bureau attached to the Board of Rites, and the issue of any counterfeit or pirated edition by others is a penal offence. Of course this only refers to the subject-matter, that is, the settled feast days and days that are auspicious or otherwise. A popular kind of almanac published is known as the "Spring Ox." This has reference to one or more customs prevalent amongst the Chinese, one indeed being confined to the Imperial Court, discontinued since the revolution. This last-mentioned is the ceremony of ploughing by the late Emperors of the Manchu Dynasty in a field adjoining the Temple of Agriculture at Peking. This took place on the day fixed by the astrologers as the beginning of spring. Another custom, also in honour of spring,

referred to is that of the prefect of the city with his subordinate officials, accompanied by citizens, going outside the city walls to burn a paper buffalo or ox. This custom varies with the people of different provinces.

There are many more mottoes and pictures to be seen at New Year time than have been mentioned here, but a description of a few of the most popular has been given to manifest a phase of Chinese life about which little has been written. The Chinese are known as a literary nation, but it is not often realised how deeply the cult of the pen in writing and in pictorial art has taken hold of the people of the Celestial Empire.

Reviews of Books

ARCTIC EXPLORATION

The Friendly Arctic. The Story of Five Years in Polar Regions. By V. STEFANSSON. (Macmillan & Co., Ltd., 30s.)

In this volume Mr. Stefansson tells the story of the Canadian Arctic Expedition of 1914-1918 which was sent out by the Canadian Government to explore the Beaufort Sea and incidentally to lay claims to any new lands discovered. It was a large expedition with a staff of no less than fifteen scientific specialists beside a number of assistants and natives. A great deal was accomplished, but not so much as Stefansson had hoped, largely because the *Karluk*, his chief ship, with most of the scientific staff, was nipped in the ice and crushed after a long drift. A few new islands were added to the Canadian Arctic Archipelago, and though circumstances prevented a penetration of the Beaufort Sea, it was shown that the existence of land in that region is most improbable. The book is long and full of detail, but never wearisome, for there was much variety and a good deal of adventure, and Stefansson takes his readers into his confidence by discussing all his difficulties as they appeared at the time. The ordinary reader who is not versed in the details of Arctic topography may find the greatest appeal in the book in the idea conveyed in the title which challenges the popular conception of Arctic regions. Nine or ten years' experience of this part of the Arctic has convinced Stefansson that it is a very pleasant place where man can live well and easily and suffer no privations or even undue discomfort. He combats the prevailing ideas of hunger, cold, heroic struggles and grim defeat—all this is quite unnecessary. His method of exploration is to live as the Eskimo live by hunting seals on the ice or caribou and musk-oxen on the land, to use blubber for fuel, and to live in snow houses. Even when he started with food on his sledges he was indifferent to the rate at which it was consumed.

When it was finished, hunting provided meals for the future. This method frees the explorer from the necessity of keeping in touch with his base of supplies, ensures light loads and gives him unrestricted liberty of movement. To a great extent Mr. Stefansson has proved the success of these methods, yet lack of seals did force him to retreat to Banks Land in his long march over the ice of the Beaufort Sea, and in another journey two men succumbed in crossing Banks Land alone, possibly, but not with certainty, through starvation. Again, it must not be forgotten that Mr. Stefansson was exploring in a region free from glaciers, with abundant vegetation in summer to support musk-oxen and reindeer. In Banks Land he found a "beautiful country of valleys everywhere gold and white with flowers or green with grass . . . sparkling brooks flowing over gravel bottoms. Heather was most abundant and so were bull caribou." Such a land may well be called friendly compared with the glaciated regions farther east.

The general conception of Arctic travel, indeed of all polar exploration, is undoubtedly erroneous, and dates very largely from the conditions obtaining in the British expeditions during the first three-quarters of the nineteenth century, not to forget the terrible story of the American expedition under Greely. Man-hauled sledges, heavy loads, clumsy fur clothing, intense cold, tinned foods, scurvy, weakness, savage bears, and above all heroic endeavour—these are the stock-in-trade of the story books of polar adventure. Winter was a time to dread, a time of inactivity and depression if not of actual illness. Monotony, largely the outcome of too little to do, had to be fought with such expedients as lantern lectures and magazine production. In reality this sort of thing is largely out of date. The wonder is that it persisted so long, for there is abundant game in most non-glaciated Arctic lands and seals are numerous in the sea. These and birds of any sort make better eating than tinned foods. Dogs are far superior to men for hauling sledges long distances, and experience has shown that the intensest cold need not be feared by men in good condition. Scurvy no longer stalks the polar explorer: he knows well how to avoid it, and the old-time monotony of winter-quarters is easily dispelled by the amount of scientific work that has to be done. Light windproof clothing is a far more effective protection than heavy furs and does not impede free movement. Of course, in Antarctic regions conditions are rather more severe, but Mr. Stefansson is not generalising for all polar travel. He speaks only of the Arctic, although some of his methods are not inapplicable, and have been adopted, in the south. In one respect, however, many polar travellers will disagree with him. The reduction in weight of the sledges involved carrying no tobacco. It was his "custom to require tobacco users to stop it." Some of us would be loth to call the Arctic friendly under these conditions. The idea that Arctic regions are silent is contended by Mr. Stefansson. We agree that the silence may be often broken by the crying of birds, the booming of grinding ice floes, and the whistling of the wind, even if the buzz of mosquitoes and hum of bluebottle flies are restricted to certain areas. But even so, the Arctic has a silence compared with

the urban life which most men live. We compare the silence of the Arctic with the noise of civilisation and closely packed human beings, not with the silence of the deserts. Mr. Stefansson will need to concede this point. Lastly, he maintains rightly that the Eskimo are neither to be pitied for their so-called hard lot nor to be considered as having solved all the problems of existence in Arctic lands. The Eskimo told him that certain regions were uninhabited because no game existed, but believing them wrong, he put his theory to the test and found the game he anticipated. As he says, the spirit of adventure is a development of high civilisation: the Eskimo ventures nothing if the risk is great and there is no hope of material gain.

The book has not a dull page from cover to cover and is well illustrated with photographs and maps.

R. N. RUDMOSE BROWN.

THE TEMPLE COINS OF OLYMPIA

The Temple Coins of Olympia. Reprinted from *Nomisma*. VIII, IX, XI. By CHARLES T. SELTMAN. With a Foreword by Sir WILLIAM RIDGEWAY. (Cambridge: Bowes and Bowes.)

Mr. Seltman has accomplished an admirable piece of research; his results are of no little interest and his work provides a model of sound archaeological method.

Whether the earliest Greek coins were minted first by cities or by individual merchants and capitalists is a matter of dispute, but from the sixth century B.C. civic coinages were the rule. Certain great religious centres, however, minted money of their own, no doubt in order to provide for the needs of visitors to a place of pilgrimage. Of such centres Olympia in Elis was second only to Delphi, for here every fourth year the Greek world met to celebrate in common the Olympic Games. Some numismatists had already suggested that the coins called Elean were in reality struck at Olympia, and a cogent argument in favour of this view was the fact that there was strong reason upon stylistic grounds for dating the earliest of such coins before 500 B.C. while the city of Elis did not come into existence before 471 B.C. By a complete survey of the extant Elean coins Mr. Seltman has proved that they were minted at Olympia, and a careful study of the dies employed has enabled him to arrange them in a continuous chronological series of self-contained groups.

A definite date is provided by the coins struck by the people of Pisa, who seized the sanctuary in 365 B.C., and from this fixed point the chronology must be reconstructed backwards and forwards. Mr. Seltman appears to repudiate the generally-accepted view that the alliance of Elis and Argos in 420 B.C. is reflected in the issue of Olympian coins with the head of Hera. He accepts the date, but upon other grounds, viz. that for the Olympic festival of 420 B.C. an increased coinage was necessary because Athens and Sparta had made peace and visitors from Athens and her dependencies, who had been prevented during ten years of war from visiting Olympia, might be expected in large numbers. It does not seem, however,

that the two reasons are mutually exclusive and both may well have been operative.

This Hera series had previously given rise to difficulties in arranging the sequence of Elean coins which Mr. Seltman's work removes. He has shown that they are the product of a second mint belonging to the temple of Hera, which for a century issued coins contemporaneously with those minted at the temple of Zeus. There is therefore no longer any necessity to displace or telescope any part of the continuous series of Zeus coins in order to make room for them.

The illustrations are excellently arranged, and it is not necessary to be a numismatist to appreciate the beauty of the coins represented upon the twelve plates which accompany the text.

W. R. HALLIDAY.

A PRIMITIVE ISLAND RACE

The Andaman Islanders. A Study in Social Anthropology. By A. R. BROWN, M.A. (Cambridge University Press, 40s.)

This book embodies the results of research work carried out in the Andaman Islands in the years 1906-1908 under the terms of the Anthony Wilkin Studentship in Ethnology of Cambridge University. Previous studies of the Andaman Islanders have been few, consisting of E. H. Man's book *On the Aboriginal Inhabitants of the Andaman Islands* (1882), M. V. Portman's *Notes on the Languages of the South Andaman Group of Tribes* (Calcutta, 1898), and his *History of Our Relations with the Andamanese* (Calcutta, 1899). A general description of the islands was given by Colonel Sir Richard Temple, at one time Chief Commissioner of the Andaman and Nicobar Islands, in the *Census of India* (vol. iii, 1901).

The great value of this new work on the subject lies in the fact that it employs the latest methods of social anthropology in the study of an almost entirely primitive, isolated people. It has indeed rescued a set of primitive ideas, customs, and legends from oblivion, and only just in time, for Western civilisation is already laying its destructive hands upon them from the Penal Settlement at Port Blair. Research of this kind does not merely serve a purpose in adding to our store of knowledge, but in providing psychologists and psycho-analysts with a new key to the "child" mind as reflected in that of savage peoples, who have developed on lines almost entirely untouched by extraneous influences. From this source much elucidation of nervous afflictions brought about by delayed maturity has already been gained.

A glance at the map will show how isolated the Andamans are. They lie out in the Sea of Bengal at an average distance of 350 miles from the Malay Isthmus on the east, and of 700 miles from that of India on the west. "The balance of probability," says the author, "is in favour of the view that the Andamans were peopled, either by sea or by land, from the region of Lower Burma." The Andamanese have been in their present home for a great many centuries, even if they did not reach it during the period of land connections. They belong to the Negrito race, the two other branches of which are the

Semang, dwelling in the interior of the Malay Peninsula, and the tribes inhabiting the interior of the Philippine Islands. Both the other branches have come into contact with other races for centuries back, and "the original Negrito culture and language and even perhaps the original physical type have been modified in these two branches of the race."

In the first four chapters a detailed description is given of these Andamanese tribes' social organisation, their ceremonial customs, their religious and magical beliefs, and their myths and legends. Despite close proximity the various tribes have retained much individuality in these respects, as also very distinct differences in their dialects. In Chapters V and VI the author interprets the psychological significance of these customs and legends, showing how closely connected they are with one another. A tribe is divided into so many local groups, each of which has its own village of palm-leaf huts arranged round a common dancing-ground. Communal life is extremely powerful amongst these local groups, and has been kept going by rigorous ceremonial in every detail of life. In this respect the author demonstrates the importance of the strange customs of painting the body with various coloured clays on special occasions, and particularly before or after the taking of certain kinds of food; of dancing; of weeping; and of the very elaborate initiation ceremonies. The latter possess similarities to some of those practised by Central African tribes. During the period of adolescence rigorous abstentions, especially in the matter of food and partaking in social life, are imposed on members of both sexes, and we find, too, amongst the Northern tribes, the phenomenon of the youth, before being admitted to the clan as a man, having to submit to the cutting of horizontal rows on his back and chest, and having to give proof of his virility by remaining silent during these operations.

In the short space at our disposal it has been impossible to do more than touch on the fringe of the information and ideas embodied in Mr. Brown's book. It is excellently illustrated by original photographs, and includes, besides the chapters mentioned, appendices on the technical culture of the Andamanese, and the spelling of Andamanese words.

E. L.

SCIENTIFIC BOOKS

A Criticism of Einstein and his Problem. By W. H. V. READE, M.A. (Oxford: Blackwell, 4s. 6d.)

What possessed Mr. Reade, a philosopher and an Oxford don, to write this book we know not. In tackling the relativists, not from the point of view of philosophy, but on their own ground as mathematicians and physicists, he has shown himself a sportsman, but, if he means this work to be taken seriously, he has put himself into a curious position. It must have occurred to Mr. Reade, who is not a profound mathematician, that, if the errors and fallacies he professes to expose really do exist in Einstein's work, they would long ago have been revealed by others. The scientist of to-day is not deficient in critical power, and diffidence in expressing unfavourable opinions of bad work is rare.

Mr. Reade says in effect: "I do not pretend to be a mathematician or a physicist, but I've done my best to understand Einstein's theory, and to me parts of the explanation which that theory involves appear to be nonsense."

We have, of course, no wish to criticise Mr. Reade for reaching this view; our quarrel with him is that he has published it. If Mr. Reade is neither a mathematician nor a physicist, the opinions he may have on this difficult subject, however cogent and logical they may appear to be to himself, are worthless; for the theory of relativity belongs to a domain of advanced mathematical physics, and none but students of that subject possess the necessary knowledge properly to understand it or to question its validity. We, all of us, are so accustomed to talk with authority on matters about which we know little, or less than we might, that a warning to keep off seems an infringement of our liberty. Nevertheless such talk is bad. The inexpert has no right whatever to criticise the expert. If he wishes to do so because of a desire to make a genuine contribution to the matter, or merely because he likes to criticise, he can attain his desire by first getting to know something about it.

The book, we should say, is often extremely amusing, and, on the whole, is best regarded, we think, as a *jeu d'esprit* written not for those who believe in Einstein's theory (for they would detect its fallacies quickly), or for those who do not (for it would simply make their confusion greater), but for Mr. Reade's own friends. But if it be intended seriously, we may say this. The author does not appear to understand the Michelson-Morley experiment; his views on relative velocity are queer; he fails to understand what a physicist means by time as a fourth dimension; his chapter on the unique position of light is almost somnambulistic. We are not going to quote chapter and verse to show up his errors; there are too many errors. Nor are we going to quote any of his preposterous assertions. We feel that the opinion of any fair-minded reader of this work may be best described in the words of a great classical scholar with which we close: Vainer exposition and worse argument than make up the staple of this book it would be difficult to conceive.

A. S. R.

Problems of Modern Science. A Series of Lectures delivered at King's College. Edited by ARTHUR DENDY, D.Sc., F.R.S. (G. G. Harrap and Co., 10s. 6d.)

This is a splendid book; a series of popular lectures delivered by experts on recent developments in science. Dr. J. W. Nicholson deals with mathematics pure and applied. In particular he emphasises how "useless" development of pure mathematics may suddenly become of practical consequence, occasionally even of great consequence. The perfectly useless Theory of Tensors, for example, developed by Riemann and others years ago has become the backbone of the mathematical work of Einstein's theory. The Quantum Theory is also described in some detail. Mr. J. B. Dale deals with astronomy, the magnitudes, motion and spectra of the stars, and the latest views on stellar evolution. Dr. O. W. Richardson

writes on problems of physics, the Quantum Theory, the work of Bohr on the atom, of Sir E. Rutherford on atomic disintegration, and of Aston on isotopes. Dr. Samuel Smiles deals in a general way with the wonder of modern organic chemistry and touches briefly on photo-synthesis. Dr. Arthur Dendy, the editor of the volume, takes stock of the present position of the Biological Sciences, and carefully outlines their subject-matters, and says several wise words on the interdependence of pure and applied science. Dr. Ruggles Gates writes on recent discoveries in palaeobotany, ecology, microscopic research and genetics. Dr. Halliburton, writing on physiology, calls attention to the importance of small things, illustrating by describing the work of hormones and vitamins in the body. Dr. Barclay-Smith's chapter on anatomy is one of the best in the book. He describes, among other things, the structure and functions of the bones of our body, and how beautifully and wonderfully they have been made.

A. S. R.

Some Physico-Chemical Themes. By Prof. A. W. STEWART, D.Sc. (Longmans, 21s.)

Students of physical chemistry who have read the usual books prescribed them, and have been appalled by the number and complexity of the subjects they are expected to "get up" in their advanced studies, will find this book extremely useful. Dr. Stewart has taken the trouble to go through the larger monographs and delve his way through original papers to express in concise form the gist of some twenty subjects concerning which the ordinary textbooks say but a few words, and those often halting. The subjects described include pseudo-acids, affinity, theories of valency, the theory of indicators, colloids, the Brownian movement, catalysis, the structure of the atom, and the periodic classification. References are given to original papers and bibliographies are appended. The book indeed is more than merely useful, it is good educationally. Dr. Stewart is to be congratulated upon it.

James Stirling. A Sketch of his Life and Works. By CHARLES TWEEDIE, M.A., B.Sc. (Oxford: Clarendon Press, 16s.)

A carefully compiled account of the life and work of the distinguished Scots mathematician (1692-1770) whose name is attached to the theorem in Analysis known as Stirling's Theorem. The book includes also the whole of Stirling's known scientific correspondence, most of which is printed for the first time.

A Treatise on the Analysis of Spectra. By W. M. HICKS, Sc.D., F.R.S. (Cambridge University Press, 35s.)

Based on an essay with which the author won the Adams prize at Cambridge in 1921. A book at once an introduction to the subject and a work of reference. The important subject of X-ray spectra, however, is not dealt with. Dr. Hicks realises the incompatibility of his own interesting work on the "oun" and recent work on isotopes, and admits that at present they cannot be reconciled.

The Structure of the Atom. By STEPHEN MIAIL, B.Sc., LL.D. (Benn Brothers, Ltd., 1s. 6d.)

An interesting, slight, and in the main an accurate, account of recent work on radio-active changes, isotopes, and the structure of the atom, written by the author, a lawyer, for students of chemistry, in "an easy and not too serious a style" free from mathematical formulae.

Books Received

(Mention in this column does not preclude a review.)

ANTHROPOLOGY

The Andaman Islanders. A Study in Social Anthropology. By A. R. BROWN, M.A. (Cambridge University Press, 40s.)

The Evolution of Kinship. An African Study. The Frazer Lecture, 1922. By E. SIDNEY HARTLAND, LL.D., F.S.A. (Oxford: The Clarendon Press, 2s.)

The English Village. The Origin and Decay of its Community. By HAROLD PEAKE, F.S.A. (Benn Bros., Ltd., 15s.)

MISCELLANEOUS

The World-Story of 3,000,000,000 (?) Years. By J. REEVES. With a Foreword by Prof. J. Arthur Thomson, M.A., LL.D. (P. S. King & Son, Ltd., 2s. 6d.)

"Twinline" Tales for Language Learners. *The Laurel Wreath (Der Lorbeerkrantz),* by RUDOLF HERZOG; *The Old Guide (Le Vieux Guide),* by JEAN RAMEAU; *Drama,* by ANTON TCHEHOV; translated word by word and edited by E. S. MOLE. (The Horder Press, 8d. each).

PHILOSOPHY AND PSYCHOLOGY

Philosophical Studies. By G. E. MOORE, Litt.D. (The International Library of Psychology, Philosophy, and Scientific Method: Kegan Paul, Trench, Trübner & Co., Ltd., 15s.)

The Misuse of Mind. By KARIN STEPHEN. With a Prefatory Letter by Henri Bergson. (The International Library of Psychology, Philosophy, and Scientific Method: Kegan Paul, Trench, Trübner & Co., Ltd., 6s. 6d.)

SCIENCE

Sidelights on Relativity. By ALBERT EINSTEIN. (Methuen & Co., 3s. 6d.)

A translation of two lectures of a semi-popular character entitled *Ether and the Theory of Relativity, and Geometry and Experience.*

Alternating Current Electrical Engineering. By PHILIP KEMP, M.Sc.Tech., M.I.E.E. (Macmillan & Co., 17s.)

Practical Plant Biology. By H. H. DIXON, Sc.D., F.R.S. (Longmans, Green & Co., 6s.)

The Analysis of Non-Ferrous Alloys. By F. IBBOTSON, D.Met., F.I.C., and L. AITCHISON, D.Met., A.I.C. Second Edition. (Longmans, Green & Co., 12s. 6d.)

A new edition of a standard work on this subject.

The Evolution of Continuity. By DAVID RUSSELL, M.D. (George Allen & Unwin, 16s.)

The Population Problem. A Study in Human Evolution. By A. M. CARR-SAUNDERS. (Oxford: Clarendon Press, 21s.)

Electricity. (Science in the Service of Man.) By SYDNEY G. STARLING, A.R.C.Sc., B.Sc. (Longmans, Green & Co., 10s. 6d.)

Metallography. By C. H. DESCH, D.Sc., Ph.D. Third Edition. (Longmans, Green & Co., 16s.)

A new edition of the standard work on metallography by the Head of the Faculty of Metallurgy in the University of Sheffield, embodying the important work on the physical properties of alloys, on corrosion, and on the metallography of iron and steel done since 1913, the date of the last edition.

Chemical Technology and Analysis of Oils, Fats, and Waxes. By DR. J. LEWKOWITSCH, M.A., F.I.C. Revised by George H. Warburton. Sixth Edition. Vol. II. (Macmillan & Co., 42s.)

The second volume of the new edition of Lewkowitsch's monumental work, dealing with the technology of the natural oils, fats, and waxes with respect to their preparation, refining, and examination for adulteration.

The Mineral Resources of Burma. By N. M. PENZER, M.A., etc. With an Introduction by Colonel O. C. Armstrong, D.S.O. (George Routledge & Sons, Ltd.)

The New Heavens. By G. E. HALE, Director of the Mount Wilson Observatory. (Charles Scribner's Sons, 7s. 6d.)

The Biology of the Sea-shore. By F. W. FLATTELY and C. L. WALTON, M.Sc. With an Introduction by Prof. J. Arthur Thomson, M.A., LL.D. (Sidgwick & Jackson, Ltd., 16s.)

Bibliographie des Séries Trigonométriques. Par MAURICE LECAT. (Chez l'Auteur: Louvain, Avenue des Alliés, 92; Bruxelles, Avenue Bois Cambre, 16.)

Food Values. What they are, and how to calculate them. By MARGARET MCKILLOP, M.A., M.B.E. Second Edition, revised and enlarged. (George Routledge & Sons, Ltd., 3s. 6d.)

An Elementary Textbook of Coal Mining. By ROBERT PEEL. Revised and enlarged by Daniel Burns, M.Inst.M.E. Twentieth Edition. (Blackie & Son, Ltd., 6s.)

The Drought of 1921. By C. E. P. BROOKS, M.Sc., and J. GLASSPOOLE, B.Sc., A.I.C. (Meteorological Office). (Reprinted from the *Quarterly Journal of the Royal Meteorological Society*, vol. xlvi, No. 202, April 1922.)

The ABC of Wireless. A Popular Explanation. By PERCY W. HARRIS. (The Wireless Press, Ltd., 6d.)

Within the Atom. A Popular View of Electrons and Quanta. By JOHN MILLS. (George Routledge & Sons, Ltd., 6s.)

The Tutorial Chemistry. Part II, Metals and Physical Chemistry. By G. H. BAILEY, D.Sc., etc. Edited by William Briggs, LL.D., etc. Twelfth Impression. Fourth Edition. (W. B. Clive: University Tutorial Press, Ltd., 6s. 6d.)

between the variations observed by Cook and by Bouvet. This was contested by Wales, Cook's astronomer in the *Resolution*. There is a résumé of the controversy in the first volume of Cook's third voyage.

Yours, etc.,
RUPERT T. GOULD,
Lieut.-Commander, R.N. (Ret.), F.R.G.S.

ADMIRALTY, S.W.I.
May 17, 1922.

To the Editor of Discovery

SIR,

The notes contributed by Lieut.-Com. Gould are of considerable interest, and I welcome them as additions to my article. Voyages of sealers are seldom easy to trace. I have met Canadian sealers at the Falkland Islands who had made many discoveries at the South Sandwich group that they never put on record, partly through indifference and partly for fear of attracting rivals. For my statements about Dougherty Island I found sufficient authority in the *New Zealand Pilot*. Now Lieut.-Com. Gould's painstaking researches have shaken my faith a little in the accuracy of Sailing Directions, but at the same time "the most remarkable part of the story," namely the circumstantial account of the visit in 1886, seems still to hold good.

I am quite aware that Ross began his general search for Bouvet Island well to the west of that island, but he reported that, when in longitude 6° E., he stood S. 55° E. in the hope of finding it. Of course he failed, as I pointed out in my article, because he was already east of the longitude of the island. Lieut.-Com. Gould has, no doubt, found the true explanation of how Ross missed Bouvet Island when he was in the correct longitude.

Yours, etc.,
R. N. RUDMOSE BROWN.

THE UNIVERSITY, SHEFFIELD.
May 25, 1922.

TAXATION AND UNEMPLOYMENT

To the Editor of Discovery

SIR,

At least one of your regular readers would welcome the more frequent appearance of articles similar to Professor Knoop's very interesting analysis of the relations between "Taxation and Unemployment." A true understanding of the various aspects of the Economic and Social sciences is becoming more and more necessary if we are to gather satisfactory fruits from the great inventions of the past and present centuries.

In Section III of his article Professor Knoop, while doubting whether a modest reduction in taxation would help to stimulate employment, suggests that it might lead to a sufficient increase in trade to prevent the revenue suffering any actual loss. I think that while assessment to Income Tax remains on the present basis of the three years' average the revenue must suffer—and rather severely—in the first year of the reduction. Although profits might increase with growing trade, the first effects of the improvement could not be felt until the following year. This being so, the Government would be obliged

Correspondence

LOST ISLANDS OF THE SOUTHERN OCEAN

To the Editor of Discovery

SIR,

May I be allowed to point out one or two slight inaccuracies in Dr. Rudmose Brown's very interesting article "Lost Islands of the Southern Ocean," in your April number?

I am afraid that what Dr. Rudmose Brown calls "the most remarkable part of the story" of Dougherty Island is partly a myth. I had occasion recently to consult the file of the *Otago Daily News*, which is the principal authority for Stannard's report of having sighted it, and I discovered that the statement which has often been made (e.g. in the Admiralty *New Zealand Pilot*) that he saw the Island twice, in 1886 and 1890, has no foundation. By his own account he saw it in 1886 only, and the second date has its origin in a mistake committed by one of the other disputants in a controversy over the existence of the island. The error has been rectified in the latest supplement to the *New Zealand Pilot*.

With regard to Norris's "Thompson Island," this has been seen at least once since his time, by Captain Fuller, of the *Francis Allen*, an American sealer, in 1893. Captain Fuller also saw Bouvet Island, and this latter was seen by Captain Williams, of the American sealer *Golden West*, in 1878, who landed upon it, and by Captain Church, of the *Delia Church*, in 1882, so that it was sighted at least three times between Norris's visit in 1825 and its "rediscovery" by the *Valdivia* in 1898.

Ross's failure to find this island in 1843 was not due to commencing his search, as Cook did, too far to the eastward. He started in longitude 2° W. (over 5° westward of the island) and ran along the parallel of latitude 54° 15' (approximately) as far as longitude 6° 30' E. In these circumstances, and considering that he hove-to every night so as to prevent his either passing or running ashore on the island in the darkness, it seems at first sight incredible that he did not sight it. Recently, however, on plotting the tracks of the *Erebus* and *Terror* afresh, from their logs, I found that shortly before they would have fallen in with it they were carried to the northward by a slant of wind (Ross says nothing about this in his book) and passed about eighteen miles north of the island, regaining its parallel a few miles farther on.

Incidentally, the fact that Cook began his search too far to the eastward was pointed out at the time by Le Monnier, who based his argument on the discrepancy

to budget for a decreased revenue, to meet which three alternatives are suggested.

The first of these, the elimination of debt redemption, has been chosen by the Chancellor of the Exchequer, in order to enable him to reduce the rate of tax. But, as Professor Knoop points out, there has so far been no reduction of debt out of taxation, and the proposed relief amounts to meeting liabilities out of capital. There can be little doubt that there will be a deficit to be met.

Increased borrowing, the second suggestion, is agreed to be bad finance and bad economics; and there is just the possibility that the resultant depreciation in our international credit might accentuate the trade depression.

The proposed reductions in expenditure are also apparently inadequate, as well as on the wrong lines; for, however great the need for economy, such essentials as public education and housing should surely be the last to come under the "Axe." This year's estimates include nearly £140,000,000 for the fighting services—three years after the conclusion of the "war to end war." One of the main roads to reduced taxation and revived trade lies clearly in the direction of a real League of Nations which would ensure a long spell of world peace, as hinted in your Editorial Notes for June. Admittedly this remedy suffers from the same defect as the immediate reduction of taxation. Its full effects could not be felt at once. But I can see no reason why the emergence of more friendly relations between the nations should not be reflected almost immediately in the national account by an immediate cessation of some expenditure on armaments.

Other methods of reducing expenditure—such as a levy on capital to redeem war debt, a reduction of the rate of interest on War Loan, and mutual cancellation of international war indebtedness—and of thus rendering reduced taxation a practical proposition, are, perhaps, rather too controversial for discussion here, although I believe they deserve more sympathetic consideration than they receive in most quarters.

Possibly, however, the most effective means of putting the national revenue in a condition to permit of an immediate reduction in the rate of taxation, and one which if properly understood would gain most popular support, would be to endeavour to increase the yield of the taxes by more intensive administration. It is common knowledge that much revenue escapes the Exchequer through the insufficient staffing of the Inland Revenue Department. As a certain sum of money must be found to meet expenditure, it is clear that, where evasion by the few is possible, the many—and in particular the larger firms and companies who are bound to publish balance sheets, and their employees—will have to be taxed at a higher rate than would be the case if all bore their fair share of the burden. Reduction in the facilities for evasion could be attained in two ways: by rendering the penalties for discovered evasion more severe; and by increasing the technical staff. The comparatively small additional expenditure on salaries would almost certainly be amply rewarded by the collection of large amounts of tax. Our taxation system would acquire in practice as well as in theory the attribute of equality of incidence.

The psychological effect of this on the honest taxpayer would be important. For many taxpayers meet the collector's demands reluctantly, not so much because they grudge the money to the nation as that they feel that their neighbours are not all paying their fair share.

Yours, etc.,
R. J. C. WEBER.

3 HIGH STREET,
RUISLIP, MIDDLESEX.

June 6, 1922.

NOTES FROM CONTEMPORARIES

Not so long ago we were hearing a good deal about proposals for the electrification of our railway systems. On this matter an abstract from a paper read before the Institute of Transport by Mr. Roger T. Smith appeared in *The Electrician* of May 19 (6d.). Mr. Smith is not by any means sanguine as to the economic possibilities of such an undertaking at present, but he advocates that railway companies and manufacturers should co-operate closely to produce electric traction equipment. Moreover, he gives interesting details of a new machine, called the "Transverter," and designed by Mr. W. E. Highfield and Mr. J. E. Calverley, which should considerably reduce the cost of transmission of electricity by converting alternating to direct currents.

As we go to press, the latest news of the second Mount Everest Expedition is that it has reached a point less than 2,000 feet from the summit. An important feature of the new attempt is the employment of oxygen. "The apparatus," as it is described in the May number of *The Geographical Journal* (2s.), "complete with four bottles of oxygen, weighs 32 lb., and it is estimated that each bottle will serve for 100 to 120 minutes' climbing; or we should say, exercise, for Prof. Dreyer stipulates for as generous a supply of oxygen (2·0 to 2·4 litres per minute) in descending as in ascending, and 1 litre per minute while at rest, even while asleep."

Norwegian literature is finding a growing public in Great Britain. Its sturdiness and virility appeal to a kindred feeling towards life. Yet, as M. Linge indicates in an article on Henrik Wergeland in the April number of *Modern Languages* (1s. 6d.), "Until 1830 Norway had no literature. Denmark was the intellectual centre. All Norwegians with literary pretensions studied in Denmark, and wrote in Danish, according to Danish principles. In that momentous year, 1830, however, the German romantic movement, and the influence of the national reawakening in France, reached Norway. Wergeland was thrilled and produced his great work." This was a poem, *The Creation—Mankind and the Messiah*. It advocated freedom and equality, and greatly matured the campaign for separation from Sweden. The Norwegian Authors' Society has recently proposed that the Government should purchase Wergeland's house in Kristiania and turn it into a Wergeland Museum.

THE Editor regrets that the first part of Mr. Julian S. Huxley's paper on *Sex and its Determination* has been unavoidably held back till the August issue.

payer
at the
cause
that

ER.

bout
ems.
e the
ared
t by
es of
that
erate
More-
alled
field
duce
ting

ount
oint
tant
t of
the
plete
t is
120
prof.
gen
ing,
o."

"A great
red
an
lern
ure.
ans
rote
hat
antic
ing
and
ion
and
ion
has
ase
o a

S.
een